The LADIES *Diary:*

OR, THE

Woman's ALMANACK,

For the YEAR of our LORD, 1746.

Being the *Second* after *Biſſextile*, or LEAP-YEAR.

Containing many Delightful and Entertaining PARTICULARS, Peculiarly Adapted for the *Uſe* and *Diverſion* of the

FAIR-SEX.

Being the *Forty Third* ALMANACK Publiſh'd of this Kind.

YE FAIR, whoſe *Bright Examples* charm the Age!
YE, who our *Souls*, our *Eyes*, our *Hearts* engage!

2. Deign to accept this Tribute of the MUSE,
Whoſe *Thoughts* are *chaſte*, and like your own, her *Views*.
Still may your *Virtues*, ev'ry Boſom warm!
And WIT, and SILENCE, brighten ev'ry Charm!



3. Then ſhall the *Soldier* bravely plunge in War,
And Fight for *Laurels* to adorn the *FAIR*.
In vain ſhall *France* and *Spain*, their Arms combine,
In vain, when *Beauty* ſhall with *Courage* join.

4. Subdu'd, deſpoil'd, and cover'd o'er with Shame,
Shall add New *Trophies* to our LADIES Fame.

Printed by *A. Wilde*, for the Company of STATIONERS, 1746.

PREFACE.

THE Design *of this* DIARY *(so long flouriſhing under the* Protection *and* Encouragement *of the* BRITISH FAIR,) *being to promote* Art *and* Ingenuity, *in what is* Uſeful *and* Entertaining, *it is hop'd, that what is annually* publiſhed *with the* Appearance *of* Excellence, *will be* blameleſs Partiality: *Since by this Means, every contributing* Artiſt *will be* ſtudious *of excelling,* Improvement *arrive at its* exalted Perfection, *and the* Abilities *of ſome, as yet* immature, *will be* perfected *by the* Example *of others. And, as* Preference *ought always to be* given *to Things* new, elegant, *and* conciſe, *every* GENIUS *will appear to Advantage in its* Turn. *With this View it is that we deſire all our* Ænigmatical Contributors *to* vary their Subject *in their* Compoſitions; *and, that our* Mathematical Contributors *will draw all their* SCHEMES perfect, *and of a* Size *fit for the* DIARY, *with* correct, *and* conciſe Solutions *to the* Queſtions, *or they will have no Pretenſions for their being Publiſh'd.*

THE Excellency *and* Uſefulneſs *of* Mathematical Learning *have been ſo well diſcuſs'd in* former DIARIES, *that it ſeems needleſs at this Time to* enlarge *more upon it. Inſtead of which is offer'd a* New Account *of the* Nature *and* Ideas *of* FLUXIONS, *(inſerted, for want of Room here, at the latter End of the* DIARY) *which, it is hop'd, will annihilate all* Objections, Doubts, *and* Abſurdities, *ſo frequently rais'd againſt the* Principles *of an* ART, *ſo* ſublime *in its* Diſcovery, perfect *in its* Operations, *and* eminently Uſeful, *above all* Others.

The EDITOR.

The ECLIPSES *for this* YEAR, 17[illegible]
Calculated by Mr. Ralph Huſſe.

TO the Inhabitants of our terraqueous Globe, there will happen four *ECLIPSES*, two of each *Luminary*: 1ſt. Of the *Moon*, Feb. 4th, but inviſible at *London*, as ending 22′: 44″ before the *Moon* riſes. The 2d. of the *Sun*, on the 4th of *March*, early in the *Morning*, but inviſible in the *Horizon* of *London*. The 3d. is a *viſible Eclipſe* of the *Moon*, the 19th of *Auguſt*, 3 quar. paſt 10 at *Night*, and viſible at *London*, according to the following *Calculation*, viz. Beg. 10 h. 46′ Mid. 12 h. 8′. End 1 h. 24′. total Duration, 2 h. 38′. Digits *eclips'd*, 8. D. 22′. The 4th. is of the *Sun*, *September* 4th. in the Afternoon, but inviſible.

Laſt Quarter, the 3d day, at 10 at Night
New Moon, the 10th day, at Midnight
Firſt Quarter, the 19th day, at 10 in the Morning
Full Moon, the 25th day, at 7 at Night

W	Circumciſion. NEW-YEAR's-DAY.	10 A 30
T	Day increaſed, and Night ſhortned 30 min.	11 57
F	*Sun* riſes 3 min. after 8, ſets 57 min after 3	Morn.
S	*Good Movements ſhould be* 10 *min. faſter than Sun*	1 25
	1 Sunday after Chriſtmas	2 51
M	Epiphany. CHRIST's Appearance to the *Gentiles*	4 19
T	Sun riſes at 8, ſets at 4. Day 8 ho. Nig. 16 ho.	5 40
W	*According to Equation of Natural Days, good*	6 46
T	*Pendulums ſhould be* 12 *min faſter than Sun*	7 36
F	Day breaks 45 min. after 5. *Plan. hour* 41 *min.*	8 10
S	Sun riſes 52 min. after 7, ſets 8 min. after 4	☾ ſets
	2 Sunday after Epiphany	6 A 25
M	*Hilary.* **Marriage comes in.**	7 40
T	**Oxford** Hilary, and **Cambridge** Lent Term beg.	8 54
W	*Sun* riſes 3 quar. after 7, ſets 1 quar. after 4.	10 1
T	*Sun* due *Eaſt*, at 5 in the morning	11 13
F	*Watches* 13 *min and half too faſt*	Morn
S	Day increas'd, Night ſhortned 1 ho. 20 min.	0 25
	3 Sunday after Epiphany. Day br. 34 min. after 5	1 37
M	Prince of *WALES* Born. Oct.b Hil. 1 Return	2 52
T	*Watch* 14 *m. too faſt. Planetary hour* 44 *mi.*	4 4
W	*Sun* riſes 34 min. after 7, ſets 26 min. after 4.	5 10
T	Hilary Term Begins	6 7
F	*Sun* riſes half hour after 7, ſets 30 min. after 4	6 53
S	Converſion of Saint PAUL.	☾ riſes
	Septuageſima. *Twilight* ends 35 min. aft. 6 even.	5 A 6
M	Quind Hil. 2 Ret. **Marriage goes out**	6 39
T	Day 9 ho. 14 min. long. Night 14 ho 46 min.	8 6
W	*Sun* riſes 21 min. after 7, ſets 39 min. after 4	9 34
T	K. CHARLES I. Martyr'd at *Whitehall*,	11 3
F	[at 12 minutes paſt One, 1648-9.	Morn

Twelve circling Moons, in creſcent and in wane,
ve ſeen revo'ving, and ſhall ſee again.
The YEAR that's paſt, is wither'd, dead, and gone;
But, *Phœnix-like*, revives again to run.

Last Quarter, the 2d day at Noon
New Moon, the 19th day, at 1 Afternoon
First Quarter, the 18th day, at 10 Morning
Full Moon, the 24th day, at 7 Morning

M.	W.	D's	Sundays, Holy-Days, Remarkable Days, Eclipses, Sun-rising, Sun-setting, Length of Days and Nights, Regulation of Clocks, Terms, Returns, Day-break, Twilight, Planetary Hours, &c.	Moon's Rising from the Full to the Change, and Setting
1		S	*Sun* rises 1 qu. after 7, sets 3 qu. after 4.	☽ M
2			Sexagesima, Purification, or, Candlemas-Day	2
3		M	Craft. Purif. 3 Ret. Day incr. 2 ho. 16 min.	3
4		T	Moon Eclips'd, Invisible. *Wa.* 14 *m.* 45 *sec. fast.*	4
5		W	Day break 9 m. after 5. Daylight ends 6, 51	5
6		T	*Watches* 14 *min. half too fast*	6
7		F	Day 10 hours long. Night 14 hours.	6
8		S	*Sun* rises at 7, sets at 5	6
9			Shrove-Sunday. Quinquagesima. Oct. Pur. 4 R.	☾ set
10		M	*Planetary hour by day* 50 *mi., by night* 70	6 A
11		T	Shrove-Tuesday. *Watches* 14 *min. too fast*	7
12		W	Ash-Wednesday, first Day of *Lent*. Term Ends	8
13		T	**Cambridge** Com. for Batch. of Arts	10
14		F	*Valentine.*	11
15		S	Day increas'd 3 hours since 12th of *December.*	Morn.
16			Quadragesima, 1 Sunday in *Lent*. Invocavit	0
17		M	Day 10 hours and half long	1
18		T	*Watches* 13 *min. too fast.* *Sun* due *East*, 5 h. 55	2
19		W	Ember-Week. *Sun* rises 39 m. aft. 6, sets 21 aft. 5	3
20		T	Day 10 ho. 42 min. long. Night 13 ho. 18 m.	4
21		F	*Planetary ho. by Day* 54 *min by Night* 66	5
22		S	Princess of HESSE Born	5
23			2 Sunday in *Lent*, Reminiscere,	6
24		M	St. MATTHIAS Day incr. 3 ho. 3 quar.	☾ rises
25		T	Day breaks 26 min. aft. 4. Day 11 ho. long	7 A
26		W	*Planetary hour by Day* 55 *min.*	8
27		T	*Sun* rises 23 min. after 6, sets 37 after 5	0
28		F	Day 11 hours 18 m long *Sun* due *East*, 5 h. 48.	10

THE Tail I'm reckon'd of the *Winter* past,
And whisk about a Show'r, or furious *Blast*;
Cold, drizling Rains, with now and then a Frost;
Phœbus still hides his Head —— but peeps at most.

Laſt Quarter, the 3d day, at 9 at Night
New Moon, the 11th day, at 2 in the Morning
Firſt Quarter, the 18th day, at 5 in the Afternoon
Full Moon the 25th day, at 8 at Night.

			Morn
1	S	St. *David*, Arch-Biſhop of *Minevia*, 584.	1 16
2	S	3 Sunday in Lent. Oculi. *Chad.*	2 32
3	M	Sun riſes 15 m. after 6, ſets 45 after 5	3 34
4	T	Sun Eclipſ'd Inviſible, *Good Watches and Pend.*	4 17
5	W	*Clocks ought to be 9 min. faſter than the Sun*	4 47
6	T	*Sun* due *Eaſt* 5 ho. 57 m. Day breaks 5 min. aft 4.	5 6
7	F	Day Increas'd 4 ho. 28 m.	5 21
8	S	*Cyprian.* Equal Day & Night. *Sun* riſ. and ſet 6	5 31
9	S	4 Sunday. Midlent Sund. Lætare. *Sun* in *Aries*	☾ ſets
10	M	*Watches 7 min. half too faſt*	6 A 48
11	T	*Sun* riſes 4 min. before 6, ſets 4 min. after 6	8 3
12	W	Day inc. 4 ho. 3 qu. Day breaks 52 m. after 3.	9 17
13	T	**Cambridge** Latter Act.	10 28
14	F	Prince EDWARD Born	11 43
15	S	*Watches and Clocks 6 min. too faſt*	Morn
16	S	5 Sunday in Lent. Judica. Sun riſes 45 m aft. 5	0 54
17	M	St. *Patrick.* Day 12 ho. 32 min. long	1 58
18	T	Day breaks 35 m. after 3. *Watch 5 min. too faſt*	2 49
19	W	*Sun* riſes 40 min. after 5, ſets 20 min after 6	3 31
20	T	*Cuthbert. Planetary hour by day 1 h. 14 m.*	3 51
21	F	Day break 3 h. 37 m. D. 12 h. 50 m. N. 11,10	4 18
22	S	**Oxford** and **Cambridge** Terms End	4 36
23	S	6 Sunday in Lent. Palm Sunday. Dom. Magna	4 51
24	M	*Sun* due *Eaſt* 17 m. aft. 6. *Sun* ri. ha. ho. aft. 5.	☾ riſes
25	T	Annunciation of Virgin Mary, or Lady-Day	7 A 48
26	W	Length of Days, 13 hours 18 minutes	9 24
27	T	D. br. 3 h. 9 m. Tw. end at 8 h. 51 Maund-T	10 58
28	F	Good-Friday. Our SAVIOUR's Crucifixion.	Morn
29	S	Len. of Ni. 10 ho. 42 min. Day inc. 5 h. 54 m.	0 24
30	S	Eaſter-Day. Our SAVIOUR's Reſurrection.	1 34
31	M	Eaſter-Monday. *Watch 1 min. too faſt*	

MARS is my Father, bluſt'ring God of War!
And Storms and Tempeſts ſtill attend my Car.
Small Intervals I give of Reſt, or Peace;
The *Earth* ſhall tremble, and I'll foam the *Seas.*

Laſt Quarter, the 1ſt day, at Midnight
New Moon, the 9th day, at 3 in the Afternoon.
Firſt Quarter, the 16th day, at 11 at Night
Full Moon, the 24th day, at 9 in the Morning

1	T	Eaſter-Tueſday. All Fools Day.	2	M	
2	W	*Sun* riſes 11 min. after 5, ſets 49 after 6			
3	T	*Watch* 20 *ſeconds faſter than Sun*			
4	F	*Now good Pendulums and Sun keep Time together.*			
5	S	*Sun ſwifter in his Motion, and gets before Clocks.*			
6	E	1 Sund. after Eaſter. Low-Sunday. Quaſimodo			
7	M	**Marriage comes in.** *Sun* due *Eaſt* 6 ho. 16 m			
8	T	*Sun riſes* at 5, ſets at 7. *Planetary ho.* 70 *min*			
9	W	**Oxford** and **Cambridge** Terms Begin			
10	T	Day incr. 45 m. att. 2. *Watch loſt* 1 *min ha of Sun*	8	A	
11	F	*Sun* riſes 54 min after 4, ſets 6 min. after 7	9		
12	S	Day increas'd 7 hours	10		
13	E	2 Sunday after Eaſter. Miſericordia	11		
14	M	Quind. Paſch. 1 Return	Morn		
15	T	Prince WILLIAM Born	0		
16	W	Eaſter Term Begins. Day 14 ho. 30 m. long,	1		
17	T	[Night 9 ho. 30 min Day break at 2 o'clock.	2		
18	F	*Watch and Clock* 3 *m. ſlower than Sun dials*	2		
19	S	*Sun* riſes 39 m, after 4. ſets 21 m after 7.	2		
20	E	3 Sunday after Eaſter. Jubilate	3		
21	M	Tres Paſchæ 2 Ret.	3		
22	T	*Sun* due *Eaſt* 58 min. after 6. *Plan hour* 74 *min*	3		
23	W	St. GEORGE, Favourite of *Chance* and *Fortune*	3		
24	T	*Sun* riſes half ho. after 4, ſets half ho after 7	☾	riſes	
25	F	St. *MARK*, Evangeliſt	10	A	
26	S	Length of Day 15 ho. Night 9 ho.	11		
27	E	4 Sunday after Eaſter. Cantate.	Morn		
28	M	Menſ Paſch 3 Ret **Weſtminſter Election.**	0		
29	T	*Watch* 4 *min. too ſlow*	0		
30	W	*Sun* riſes 20 min. after 4, ſets 40 min. after 7	1		

I, with my pearly Drops, refreſh the *Earth*,
Make *Nature* pregnant, and aſſiſt her Birth:
The coupling Birds and Beaſts my Warmth inſpires;
Through ev'ry Vein they feel the genial Fires.

Last Quarter, the 2d day, at 1 in the Morning
New Moon, the 9th day, at 5 in the Morning
First Quarter, the 17th day, at 2 in the Morning
Full Moon, the 23d day, at 9 at Night
Last Quarter, the 30th day, at 10 at Night

1	T	St. Philip and Jacob	1	M 4
2	F	Day 15 ho half long. Nt. 8 ho and half	1	58
3	S	**Marriage goes out.** *Su.* ri. 1 q. aft. 4, sets 39 7	2	12
4		Rogation. 5 Sunday after Easter. Jucunditatis	2	20
5	M	Rogation Week. Quind Pasch. 4 Returns	2	29
6	T	Day increas'd, and Night shortned 8 ho. 1 min.	2	39
7	W	*Watches* 4 *min. too slow*	2	51
8	T	Holy-Thursday. CHRIST's Ascension. Fœlix	3	12
9	F	Craft. Ascen. 5 Ret. *Plan. ho by day,* 1 *ho* 19 *m.*	☾	sets
10	S	*Sun* due *East,* 7 ho. 6 min.	9	A 50
11		6 Sunday after Easter. Exaud.	10	50
12	M	Term Ends	11	39
13	T	*No real Night, but all Twilight 'till* 14*th of* July	Morn	
14	W	*Sun* rises at 4, sets at 8 Day 16 ho. Night 8 ho.	☉	12
15	T	**Oxford** and **Cambridge** Terms End.	☉	34
16	F	Day incr. 8 ho. 3 qu. *Watch* 3 *min half too slow*	☉	57
17	S	*Sun* rises 4 min. before 4, sets 4 min. after 8	1	11
18		White-Sunday; or, The Descent of the Holy Ghost	1	23
19	M	White-Monday. *Dunstan.*	1	35
20	T	White-Tuesday. *Plan. ho* 8 1 *m. Sun East* 7 h. 12	1	44
21	W	Ember-Week. *Watches* 3 *min too slow.*	2	0
22	T	*Sun* rises 51 min. after 3, sets 9 min. after 8	2	23
23	F	Day 15 ho 20 min. long. Night 8 ho. 40 m.	☾	rises
24	S	Prince GEORGE Born.	10	A 1
25		Trinity-Sunday. **Marriage comes in.**	0	49
26	M	Craft Trin. 1 Ret. **Trin. College** Elect. *Aug*	11	24
27	T	*Sun* rises 47 m. after 3, sets 13 m. after 8	11	47
28	W	**Oxford** Term Begins *Watches* 2 *min. too slow*	Morn.	
29	T	Corpus Christi Day. K. CHARLES II Rest.	☉	4
30	F	Princ. *Amelia* and *Caroline* B. Trin. Term Beg.	☉	16
31	S	*Sun* rises 1 qu. after 3, sets 1 q after 8	☉	27

WHO is not pleas'd to see the Month of *MAY?*
All Nature jocund, blithesome, blooming, gay.
The *Fields* and *Floods* their various Pleasures give,
Ev'n *Age* itself seems now content to live.

New Moon, the 7th day, at 4 in the Afternoon
First Quarter, the 15th day, at 1 in the Morning
Full Moon, the 22d day, at 3 in the Morning
Last Quarter, the 29th day, at 10 at Night

1	E	1 Sunday after Trinity	☽ M.
2	M	Octab. Trin. 2 Returns	0 4
3	T	Day 16 hours, 32 min. long Night 7 ho 28	0 5
4	W	Sun due *East* 17 m. aft. 7. *Plan ho* 83 *by day*	1
5	T	*New good Clocks, &c. go equal with the Sun*	1 2
6	F	Sun rises 42 m. after 3, sets 18 m. after 8	1 4
7	S	Sun rises about the 5th part of a minute earlier.	☾ sets
8	E	2 Sunday after Trinity	9A 1
9	M	Quind Trin. 3 Ret Greatest L of days 9 ho 16 m	10
10	T	The Longest Day is 16 ho. 36 m. *Sun* in *Cancer*	10 3
11	W	K. GEORGE II. Inaug. St. Barnabas	10 5
12	T	*Sun being very slow, Watches gain'd* 1 *min. and ha*	11 1
13	F	*Sun* due *East*, 18 min. after 7 morn	11 2
14	S	*The old* Jewish, *or Planetary hour,* 1 *ho.* 23 *min*	11 3
15	E	K. GEORGE II. Procl. 3 Sunday after Trinity	11 4
16	M	Tres Trin. 4 Ret. Day 16 ho. 34 m. long	Mo
17	T	*Watches have gain'd* 2 *min. and half of Sun*	0
18	W	Tom Bad. *Sun* rises 44 m. aft. 3, sets 16 aft 8	0 2
19	T	Day decreas'd 4 minutes	0 4
20	F	*Watches too fast* 3 *min.*	1 1
21	S	Sun rises 49 m. after 3, sets 11 after 8	☾ rise
22	E	4 Sunday after Trinity	8A 1
23	M	Day 16 ho. and half long. Night 7 ho. and half	9 4
24	T	St. JOHN Baptist, or, Midsummer-Day.	10
25	W	**St. John's College Oxon.** Election.	10 1
26	T	*Watches and good Pendulums* 4 *min before Sun*	10 2
27	F	Sun rises 11 m. before 4, sets 11 min. after 8.	10 3
28	S	Day 16 ho. 20 mi long. Decreas'd 15 m.	10 4
29	E	5 Sunday after Trinity. St Peter, and S. Paul.	10 5
30	M	**Exeter College** Election	11

I am the Strength and Vigour of the *YEAR*;
With Me *Earth*'s num'rous Progeny appear.
The *Fruits*, the *Plants*, the *Corn* mature apace;
The crooked *Scythe* lays down the spiring Grass.

New Moon, the 7th day, at 3 in the Morning
First Quarter, the 14th day, at Midnight
Full Moon, the 23d day, at 7 in the Morning
Laſt Quarter, the 30th day, at 4 in the Afternoon

1	T	**Cambridge** Commencement	11 M25
2	W	Visit. *Mary* *Sun* riſes 54 min. aft. 3, ſets 6 aft 8	11 47
3	T	Day 16 ho. 10 min. long. Night 7 ho. 50 min.	Morn
4	F	*Plan. hour by day*, 81 *m.* *Sun* due *Eaſt* 7 h 9 m	0 18
5	S	*Watch too faſt* 5 *min.* 1 *quarter*	0 57
6	E	6 Sunday after Trinity	1 59
7	M	**Oxford Act**, ſeven Days before Term Ends	(ſets
8	T	*Sun* riſes at 4, ſets at 8. [*Thomas á Becket*	8 A57
9	W	*Sun* due *Eaſt* 7 min. after 7 in morning	9 14
10	T	*Watches* 5 *min. and half too faſt*	9 29
11	F	Day 15 hours, 50 min long. Night 8 ho. 10 m	9 42
12	S	*Now ſome Night again, Sun at Midn. being* 18	9 53
13	E	7 Sunday after Trinity. [*Deg. below Horizon.*	10 7
14	M	*Sun* riſes 9 min. after 4. ſets 51 after 7	10 22
15	T	*Swithin*, Biſhop of *Winchester.*	10 45
16	W	Day breaks 27 min. aft. midnight.	11 15
17	T	Day decreas'd 1 hour. *Watches* 5 m. 3 q. too faſt	11 59
18	F	*Sun* riſes 1 q. after 4. ſets 3 q after 7	Morn
19	S	Dog-Days Begin. *Sirius*, Dog-Star, riſes with *Sun*	1 2
20	E	8 Sunday after Trinity. Day break at 1 a-clock	2 19
21	M	*Planetary hour by day*, 1 *ho.* 16 *min.*	(riſes
22	T	*Magdalen.*	8 A20
23	W	Day dec. 1 ho. 20 mi. *Wat.* 5 *m half too faſt*	8 31
24	T	**Magdalen College Oxon. Election.**	8 40
25	F	St. JAMES, the Apoſtle	8 51
26	S	Day 15 ho. Night 9 ho. long	9 2
27	E	9 Sunday after Trinity	9 11
28	M	Sun riſes 30 m. after 4, ſets 30 min. after 7	9 27
29	T	*Watches* 5 *min. too faſt*	9 46
30	W	Day ſhortned 1 ho. 3 quarters	10 13
31	T	Princeſs *AUGUSTA* Born	10 51

UP, Up betimes, and taſte the morning Air;
Walk o'er your Lands, and take your Pleaſure there;
At *Noon* recline beneath ſome ſpreading Trees,
And in the *Ev'ning* ſnuff the cooling Breeze.

New Moon, the 5th day, at 6 at Night
First Quarter, the 12th day, at 9 at Night
Full Moon, the 20th day, at 5 at Night
Last Quarter, the 28th day, at 10 in the Morning

1	F	*Lammas-Day*	11	A
2	S	*Good Pend. Watch and Clo. 4 min. half too fast*		Morn
3	E	10 Sunday after Trinity	0	
4	M	*Sun* rises 45 min. after 4, sets 15 after 7	2	
5	T	Day 14 ho. half long Night 9 ho. and half.	☾	set
6	W	Day-break 15 mi. after 2. *Twil.* end 9 ho. 45 m.	7	A
7	T	*Watch, Clock and Sun-dials won't go alike; if*	7	
8	F	*Movements be good, will be 3 min before Sun.*	8	
9	S	*Planetary hour by day 1 ho. 11 min. Night 49 m*	8	
10	E	11 Sunday after Trinity. *Lawrence.*	8	
11	M	Day break 30 m. af. 2. *Sun* due *East* 6 h. 38 mi.	8	
12	T	*Sun* rises at 5, sets at 7. Day 14 ho. Night 10 h	9	
13	W	*Watches 2 min too fast*	10	
14	T	*Sun* due *East* 35 min after 6 morn	10	
15	F	Day decreas'd 2 ho. 50 min		Morn
16	S	Day break 47 m. aft. 2. *Twil.* ends 13 m. aft. 9	0	
17	E	12 Sunday after Trinity.	1	
18	M	*Sun* rises 8 m. aft. 5, sets 52 aft. 6	2	
19	T	MOON Eclips'd 3 quar. past to at Night, Visible.	☾	rises
20	W	*Now Watch and Clock should keep Time exactly*	6	A
21	T	*with the Sun, his Motion being swifter*	7	
22	F	Day 13 ho. 30 m long. Night 10 ho. 30 m.	7	
23	S	*Now Watch and Clocks lose 1 m. of the Sun*	7	
24	E	13 Sunday after Trinity. St. Bartholomew	7	
25	M	Day decreas'd 3 ho. 24 min.	7	
26	T	Day 13 ho. long, Night 11 ho.	8	
27	W	Dog Days End. *Canis Major* rises at 3 morn.	8	
28	T	*Sun* rises half ho. after 5, sets half ho aft. 6	9	
29	F	*The Crepuscuium or Twilight ending, is, when the*	10	
30	S	*Sun is got full 18 Degrees below the Horizon*	11	
31	E	14 Sunday after Trinity. *Watch 3 m ha. too slow.*		Mor

PREPARE, Ye *Reapers*, for the yellow Field;
The bending *Corn* will to your *Sickle* yield.
Ye *Farmers*, gather in the ripen'd Grains;
The Market will reward your *Harvest-Pains.*

New Moon, the 4th day, at 6 in the Morning
First Quarter, the 11th day, at 1 in the Afternoon
Full Moon, the 19th day, at 1 in the Morning
Last Quarter, the 26th day, at 10 at Night

1	M	Sun rises 38 min. after 5, sets 22 min. after 6	1 M 1 2
2	T	LONDON Burnt, in the Year 1666	2 38
3	W	Day 12 ho. 30 min. long. Night 11 ho. 34 m.	3 5
4	T	[illegible] Invisible	☾ sets
5	F	*Sun* rises 3 qu after 3, sets 1 qu. after 6	6 A 30
6	S	Day decreas'd 4 ho. 15 min.	6 45
7	E	[illegible] Sunday after Trinity	7 4
8	M	*Watches 6 min. too slow*	7 29
9	T	*Sun* rises 55 min. after 5, sets 5 min. aft. 6	8 7
10	W	*Planetary hour now equal to the Common Hour*	8 59
11	T	*Equal Day and Night in all the Habitable World*	10 7
12	F	*Sun* rises and sets at 6 [*Sun* in ♎	11 25
13	S	*Watches* 8 *min. too slow. Plan. ho.* 58 *min.*	Morn.
14	S	16 Sunday after Trinity. Holy-Rood-Day	0 50
15	M	Day shortned 4 ho. 50 m. Day break 6 min aft. 4	2 9
16	T	*Sun* rises 9 mi. after 6, sets 9 min. before 6	3 28
17	W	Ember Week. Day shortned 5 hours	4 43
18	T	Day 11 ho. 28 min. long.	☾ rises
19	F	Sun rises 1 qu. after 6, sets 1 q. before 6	5 A 44
20	S	*Watches* 10 *min. too slow*	5 56
21	S	17 Sunday after Trinity. St. MATTHEW.	6 12
22	M	*Planetary hour by day,* 56 *m. Sun* East 5 h. 48 m.	6 34
23	T	Day break 25 min. after 4	7 1
24	W	*Watches* 11 *min.* 1 *qu. too slow*	7 41
25	T	Day 11 ho. long. Night 13 ho.	8 34
26	F	*Sun* rises 30 m aft. 6, sets 30 min. after 5	9 41
27	S	*Watches* 12 *min. too slow*	10 57
28	S	18 Sunday after Trinity. Day br. 34 m. aft. 4	Morn.
29	M	St. MICHAEL, the Arch-Angel	0 17
30	T	*Sun* rises 37 min. after 6, sets 23 min. after 5	1 43

NOW press the *Grape*, 'twill yield *nectareous* Juice;
Make generous Wine, and Wine makes Gods of us!
The *Apple* too, should feel the squeezing Arm;
Cyder will cherish, and your Vitals warm.

New Moon, the 3d day, at 7 at Night
First Quarter, the 10th day, at 9 at Night.
Full Moon, the 18th day, at 1 in the Afternoon
Laſt Quarter, the 25th day, at Midnight

1	W	*Watch and Clock* 13 *min.* 1 *q. ſlower than Sun.*	3 M
2	T	Day break 42 min. after 4. Twil. ends 7. 18.	4
3	F	*Sun* riſes 3 q. aft. 6. ſets 1 q after 5	☾ ſe
4	S	Day 10 ho. half long. Night 13 and half	5 A
5	E	19 Sunday after Trinity	5
6	M	*Good Pendul. will be* 14 *min. ſlower than Sun*	6
7	T	Day decreas'd 9 hours 20 min.	6
8	W	*Sun* riſes 54 min. after 6, ſets 6 min. after 5.	8
9	T	St *Dionyſius.* Day breaks at 5 in the morning	9
10	F	**Oxford and Cambridge** Terms Begin.	10
11	S	King GEORGE II. Crowned.	Mon
12	E	20 Sunday after Trinity. *Watch* 15 *m* 1 *q. too ſlo.*	0
13	M	Day ſhort. 6 h. 42 m. *Planetary hour* 49 *m.*	1
14	T	*Sun* riſes 6 min after 7, ſets 24 after 4.	2
15	W	*According to Equation of Natural Days, good*	3
16	T	*Pend. Clocks & Watch* 15 *m. ba. after Sun*	5
17	F	*Sun* due *Eaſt* 10 min. after 5 in the morn.	6
18	S	St. LUKE, Evangeliſt. Day 9 h. half long	☾ ri
19	E	21 Sunday after Trinity. *Sun* riſes 1 q. after 7,	4 A
20	M	Treſ. Mich. 1 Return. [ſets 3 q. after 4	5
21	T	Day break 15 m after 5. Shortned 7 ho. 1 quar.	5
22	W	Princeſs of ORANGE Born	6
23	T	Michaelmas Term Begins	7
24	F	The old unequal *Jewiſh*, or *Plan.* hour, 45 m. lo.	8
25	S	*Criſpin.* Day 9 ho. long	10
26	E	22 Sunday after Trinity. *Sun* riſes 30 m. after 7,	11
27	M	Menſ. Mich. 2 Ret. [ſets 30 m. after 4	Mon
28	T	St. SIMON and JUDE, Apoſtles	0
29	W	*Watch* 15 *m.* 3 *q ſlower than Sun-dial*	2
30	T	King GEORGE II. Born, 1683	3
31	F	*Sun* riſes 37 m. after 7, ſets 23 after 4	5

YE *Topers*, who delight in humming *ALE*,
Mellow, and ſoft, and fine; or brown, or pale;
Now Brew with *choice Ingredients* what you can;
Nature's true Produce is the beſt for Man.

New Moon, the 2d day, at 8 in the Morning
First Quarter, the 9th day, at 5 in the Morning
Full Moon, the 17th day, at 2 in the Morning
Last Quarter, the 25th day, at 2 in the Afternoon

		☾
S	All Saints. Day 8 hours 42 minutes long.	☾ sets
S	23 Sunday after Trinity. All Souls	4 A 4
M	Craſt. Anim. 3 Ret. **All-Souls Coll.** Election	4 46
T	Sun riſes 45 min. after 7, ſets 15 min. after 4	5 45
W	Gun-Powder PLOT, 1605.	6 59
T	Day 8 ho. 26 m. long. Night 15 ho. 34 m.	8 24
F	Day break 42 min after 5. Twil. end 18 aft 6.	9 46
S	*Watch and Clock ſhould be 14 m. ſlower than Sun*	11 10
S	24 Sunday after Trinity. *Sun* riſes 52 min. after 7	Morn
M	Day 8 h. 12 m long. [ſets 8 mi. aft. 4	☉ 26
T	*Martin*, Biſhop of *Tours*	1 34
W	Craſt. Mart. 4 Returns.	2 48
T	Day decreaſed 8 ho. 32 min.	4 1
F	Prince WILLIAM HENRY Born.	5 12
S	Sun riſes at 8, ſets at 4. Day 8 ho. Night 16 ho.	6 24
S	25 Sunday after Trinity. Sun *Eaſt* 4 ho. 51 m	☾ riſes
M	*Jewiſh* ho. by day, 40 min. by night 80 m.	3 A 39
T	Octab. Mart. 5 Ret. *Watches 11 m. too ſlow.*	4 23
W	Princeſs of WALES Born	5 20
T	Sun riſes 6 m after 8, ſets 54 after 3	6 28
F	Day breaks 55 m. after 5 7 ho 48 mi long	7 41
S	*Cecilia*, Virgin, and Martyr, Anno 225	9 1
S	26 Sunday after Trinity. *Clement*	10 21
M	Days ſhortened 9 hours	11 41
T	Quind. Mart. 6 Returns. St. *Catherine.*	Morn
W	*Watches 8 min. too ſlow*	1 4
T	**Baliol College** Election	2 28
F	Michaelmas Term Ends.	3 57
S	Sun riſes 15 m. after 8. ſets 45 after 3	5 29
S	Advent Sunda. **Marriage goes out.**	7 4

Short are the *Days*, the *Ev'nings* cold and long,
Let us amuſe our Selves with *Chat*, or *Song*;
With Mirth, or *Gambols*, paſs the tedious Hours,
Or read, or play at *Cribbage*, or *All-Fours*.

New Moon, the 1ſt day, at 9 at Night
Firſt Quarter, the 8th day, at Noon
Full Moon, the 16th day, at 3 in the Afternoon
Laſt Quarter, the 24th day, at 5 in the Morning

1	M	*Sun* riſes 16 min after 8, ſets 16 m before 4
2	T	Day 7 ho 28 min. long. Night 16 ho. 32 min.
3	W	*Watches 4 min and half too ſlow*
4	T	Day breaks 2 min. after 6. Shortned 9 ho. 12 m.
5	F	*Planetary hour 37 mi. Sun* due *Eaſt* 4. 43
6	S	*Sun* riſes 18 min. after 8, ſets 42. after 3.
7	E	Princeſs of *Denmark* Born. 2 Sund. in Advent
8	M	The greateſt ſhortening of the Day is 9 ho. 14 m.
9	T	Day 7 ho. 24 min. long
10	W	*Sun* riſes at *Coventry* 18 m. after 8, ſets 42 aſt. 3.
11	T	Shorteſt day 7 ho. 24 m. Sun in ♑
12	F	*Now good Clocks, Watches, and Sun go together*
13	S	Day breaks at 3 min. after 6
14	E	3 Sunday in Advent. Day incr. 1 min.
15	M	*Sun* riſes 17 min. after 8, ſets 17 min. before 4
16	T	*O Sapientia.*
17	W	Ember Week. **Oxford** and **Camb.** Terms End
18	T	*Good Pendulums gain 2 m. 1 h. of Sun in 6 days*
19	F	Day 7 hours and half long
20	S	*Sun* riſes 1 q. after 8, ſets 3 q. after 3
21	E	4 Sunday in Advent. St. THOMAS Apoſtle
22	M	Day increas'd 9 min. Day 7 ho. 32 min. long
23	T	*Sun* riſes 13 min. after 8, ſets 47 min. after 3
24	W	Day break at 6. *Watches 5 min. half too faſt.*
25	T	CHRIST-MAS-DAY.
26	F	Saint STEPHEN, Proto-Martyr.
27	S	Saint JOHN, Evangeliſt.
28	E	INNOCENTS; or, *Herod*'s Murthering [the Infants. 1 Sunday after Chriſtmas
29	M	
30	T	Princeſs *ELIZABETH* Born.
31	W	*Sun* riſes 6 min. after 8, ſets 54 m after 3.

ON ev'ry Side, now rugged *Winter* lowrs,
Arreſts the Floods, and chills the vital Pow'rs.
Rueful, and ſquallid, *Nature*'s *Face* appears,
And weeps on ev'ry Buſh her ſolid Tears.

ANSWERS to the ÆNIGMA'S.

YOUR DIARY, *LADIES*, yet once more appears,
Tho' *B*———*n*'s gone! *A*———*a* drown'd in Tears.
B———*n*! who made it long his conſtant Care,
At once to pleaſe, and to inſtruct the FAIR:
To lead *Philoſophers*, and *Philomaths*,
In Art and Nature's leaſt frequented Paths,
No longer deals in *Ænigmatic* Rhyme,
Or keeps the annual Regiſter of *TIME*:
RIDDLES to Him are loſt in *Certainty*,
And *TIME* abſorb'd in vaſt *ETERNITY!*
But his Belov'd *A*———*a* ſtill remains,
And mourns his Loſs, in ſadly-moving Strains!
That Loſs, however, She would fain Repair,
By ſtill continuing to divert the FAIR
In This her *DIARY*, which muſt be confeſt
To be the *Guide*, and *Mother* of the Reſt.
Let this induce each gen'rous Pen to join
In the Promotion of this *good Deſign*;
And ſhew that *Fame* is not ſo much their *End*,
As *Grief* to ſooth, and *Merit* to befriend:
'Tis *Theirs* to offer at the MUSES Shrine
The Produce of the unexhauſted Mine;
The *AUTHOR*'s Taſk their PRESENTS to *collect*,
And thence the choiceſt Jewels to *Select*:
If this be done with equal *Skill* and *Care*,
And We ſo pleas'd as heretofore We were,
What would we more? Then, for *A*———*a*'s Sake,
Let us ſupport the *WOMAN*'s *ALMANACK*.

W. C.

ANSWERS to the ÆNIGMA'S in the Laſt YEAR'S DIARY.

267 *A* CLOCK-STOCKING.
268 SILVER SPURS.
269 *Letter* A.
270 *An* EXCISEMAN.
271 *A* WAFER.
272 *A* SWORD.
273 *A* WEDDING-RING.
274 *A* LADY'S PICTURE.
275 *A* SAW.
Prize *A* CORRACLE.
Greek SLEEP.
French *A* YEAR.

ÆNIGMATIBUS Anno 1745. *propositis penè omnibus* SOLUTIO, *per* Radulphum Rattle.

Excipit imprimis Oculos *TIBIALE decorum;
Ecce latet quoque quam bellè nitidum propè CALCAR!
Pazzonis GLADIUS nodosa Ænigmata scindit;
CYMBULA (ni fallor) *Damonis*, Præmia tollit.
Græco SOMNUS inest, altoq; A LITTERA præstò;
Noscitur atq; "Notis" CENSUS "Baculoq;" COACTOR.
Concinnè hic HYMENÆ effingit IMAGINEM honesti;
Atque vafrè LIBUM *Jepsoni* carmina SIGNAT.

* *Pes Antibacchius.*

All the ÆNIGMA'S *in the* LADIES DIARY, 1745 *answered, in the following Lines on* Discontent.

HOW Few can avoid *Discontent!*
For whatever's our State and Condition,
Our Theme is all *Wish* and *Complaint*,
Unsatisfied ev'n in Fruition.
The *Weld-Man* that carries his CANOO,
And his *Joan* without STOCKING or Shoe;
Hope to barter their Fish for some *Rino*,
And Then change their *Old-Cloaths* for *New*.
But having obtain'd their *Desire*,
New Complaints, and *new Wishes* take Place;
And Flax having spun to the Hire,
She wants it to pourtray her FACE.
So he that hath *Buskins*, wants *Boots*,
And he that hath Boots wants gilt SPURS;
With the *Batchelor* HYMEN best suits,
The *Married Man* wants a Divorce.
A *Father* too fond of his Boy,
Hopes the Booby'll, in Time, prove a Wise-Man,
And if Great A his Fescue employ,
Would fain get him dubb'd an EXCISE-MAN.
The *Recruit* hopes a *Serjeant* to be,
Tho' he never made Use of his SWORD:
The *Sailor*, a *Midship man* he;
Tho' he has not been three Months aboard.

The Wood-cutter underſtands Building,
he knows but a SAW from a Hatchet; 9.
Tho' a Buſ'neſs he's wholly unſkill'd in,
thinks he can eaſ'ly diſpatch it.
The Clergy for Biſhopricks kneel,
e Sexton would SLEEP in a Pew: *Greek.*
The Lawyer would have the Great SEAL, 5.
d fancies it is but his due.
Thus daily, and YEAR after Year, *French.*
s wiſhing and wiſhing again;
And all diſcontented appear,
o' they ſhould all their Wiſhes obtain.

W. Chapple.

the *Ænigma's* anſwer'd *ex Tempore* at *Dorinda's* Requeſt, by Mr. *Ralph Huiſe.*

For want of a better, I SEAL you this Letter, 5.
ving anſwer'd with Pleaſure what we SAW laſt YEAR; 9. *Fr.*
he REST will in Rhyme with a CORRACLE chime,
e RINGS, Fans and PICTURES muſt needs pleaſe the Fair. 7. 8.
hilſt the Fop ſtruts and goes in his Boots and white HOSE, 1.
th SPURS, SWORD, and Tye-wig, he looks like a Fool! 2. 6. 3.
hom the Sages deſpiſe, as moſt People EXCISE, 4.
t to keep within Compaſs is ſure the beſt Rule.

Anſwer'd by Mr. *William Jepſon.*

The YEAR, a STOCKING, SPUR, and A *Fr.* 1, 2, 3.
SURVEYOR OF EXCISE; 4.
A WAFER, SWORD, a WEDDING-DAY 5, 6, 7.
A CORRACLE the Prize. *Prize.*
But in the intermediate Space,
Portia's PICTURE ſee: 8.
The laſt might claim the heading Place
A SAW's from Error free. 9.

A Rhapſodical Anſwer to all the *Ænigmas*, by Mr. *Chriſtopher Maſon.*

——————————O ſacred Reſt!
Sweet pleaſing SLEEP! of all the Pow'rs the beſt!
Then laughs the childiſh Year with Flowrets crown'd,
And laviſhly perfumes the Fields around.
Fair *Cloe*'s HOSE adds to her Shape no Grace;
Yet galling SPURS add Swiftneſs to the Race.
A— PUBLICANUS drudges for the Weal;
And *Cancellarius* to promote the SEAL.
Now glitt'ring SWORDS are brandiſh'd in the Air,
And Nuptial RINGS add Luſtre to the Fair.
Such are thy PICTURES *Kneller!* ſuch thy Skill,
That Nature ſeems obedient to thy Will!
A SAW corrodes, divides and multiplies:
In wav'ring leathern BOAT is found the Prize.

Ecce iterum Criſpinus *adeſt* ——!

Miſs N—l—y C—rg—y anſwers the *Ænigmas*, in *Lucy*'s Reply to *Tom Fickle* the young EXCISEMAN, excuſing himſelf for not marrying her at the Time appointed.

I'll hear no more——inconſtant Youth, be gone;
Nor longer ſwear, the RING ſhall make us one.
How cou'd I think e'er Truth in *Thee* to find,
Since wav'ring as a SHIP toſs'd by the Wind,
Light as A WAFER is ev'n *all* Mankind.
'Fore I conſented to be made thy Wife,
Thou often vow'd a SWORD ſhou'd end thy Life.
Then, then, thou mad'ſt me thy *peculiar* Care,
And the Silk STOCKINGS bought at *W—g—n* Fair:
Preſenting, ſaid, ('tis Vanity to tell)
" No PICTURE can thy beauteous Self excel."
Booted and SPUR'd thou joyful *then* wou'd'ſt come
To viſit me ſo many Miles from Home!
Yet now (Ah! falſe Ingrate!) thou prov'ſt untrue;
Therefore henceforth, light, perjur'd Swain, adieu.

All the *Ænigmas* anſwer'd by *Cornelia* to *Damon*.

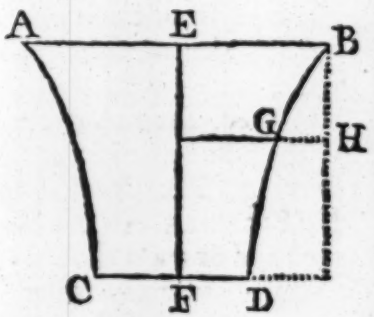
What Diſappointment, *Damon*, rack'd thy Breaſt,
That thou with Spleen thy CORRACLE has dreſt? *Pr.*
Think on the circling YEAR with Months and Days, *Fr.*
When thou in ſofter Notes did'ſt tune thy *Lays*
To *Panegyricks*, on two unknown As. 3.
But 'twas the PICTURE of their Minds thou SAW, 8, 9.
Which SPUR'd thy Pen, and kept thy SWORD in awe; 2. 6.
And not the fading Beauties of a Face,
Nor curious POINTS drawn on another Place, 1.
That SEAL'd thy Hopes, and taught thy Muſe to ſing 5.
Of waking Raptures, in a wedding RING. 7.
If now *Endymion* like, thou CLOSE THINE EYES *Gr.*
On *Latmus* Top, think not to 'ſcape EXCISE. 4.

In like Manner were they anſwered by Mr. *John Stuart*, Mr. *Southeld*, Mr. *William Wyld*, Mr. *James Hall*, Mrs. *Iſabel Knabbs*, Mr. *Thomas Pemberton*, *Sachariſſa*, Mr. *Abr. Clarke*. Mr. *Peter Dutton*, and ſeveral others, as may be ſeen in the Catalogue.

ANSWERS to the *Queſtions* in the laſt Year's DIARY.

The 256th Queſtion anſwer'd by Mr. *J. Landen*.

Let ABCD repreſent the *Mortar*, generated by the Revolution of the *parobolic* Curve BD, about the Axis EF, parallel to BH. Call EB, b, BH, x, GH, y, and put $3,1416 = p$. Then will $p \dot{x} \times bb - 2by + yy$ be the Fluxion of the requir'd Solidity; which by putting for y and yy, their Values $x^{\frac{1}{2}}$ and x (found by the Equation of the Curve) will be $p \dot{x} + b^2 + x - 2b\sqrt{x}$, and its Fluent $pb^2x + \frac{1}{2}px^2 - \frac{4}{3}pb\sqrt{x^3}$;

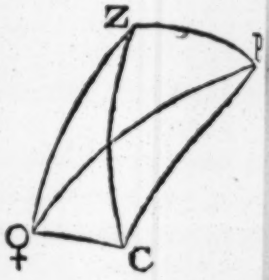


$\sqrt{x^3}$|; which when $x = 9 =$ E F will be 466,5276 Inches $=$ 2,0108, *&c.* Wine Gallons. Q. E. F.

This Question was also solv'd by Mr. *Heath*, Mr. *Farrer*, Mr. *Powle*, *Bironnos*, Mr. *Ash*, Mr. *R. Williams*, Mr. *Arch. Scyth*, and Mr. *Bamfield*.

Question 257th answer'd by *Bironnos*.

The Place of *Venus* at the given Time, is ♍ 20° 50′. 49″ her Latitude 1° 22′. 7″ N. Declination 20°. 27′ South, and is 44°. 29′. 45″, short of the Meridian: Hence there is known, Z C, the Comet's true Zenith Distance $=$ 84°. 48′. 35″. Z P, the Co-latitude of the Place, $=$ 37°. 40′. ∠ Z P ♀ $=$ 44°. 29′ 45″. ♀ P, the Distance of *Venus* from the Pole $=$ 110°. 27′, & ♀ C the Comet's Distance from the Vertex $=$ 56° 36′. In △ Z P ♀ is known Z P, P ♀ and ∠ P. Find the ∠ Z ♀ P $=$ 25°. 35′. 49″. Z ♀ $=$ 82°. 25′. 41″.



In the △ Z ♀ C, is known the three Sides. Find the ∠ Z ♀ C $=$ 88°. 44′. 54″. From which take the ∠ Z ♀ P, and there remains the ∠ P ♀ C $=$ 63°. 9′. 5″. Then, in △ P ♀ C, is known P ♀. C ♀, & ∠ P ♀ C. Find the ∠ ♀ P C $=$ 48°. 59′. 54″. & P C $=$ 80°. 44′. 20″. The Comet's Declinat is 9°. 15′. 40″ N. and Right Ascen. 341°. 19′. 34″. Hence the Comet's Longitude is ♓ 16. 25′. 26″. and Latitude 15°. 54′. 54″. N.

Question 258 answer'd by Mr. *J. Powle*.

Put S $= 1 + 4 + 9 + 16$, *&c.* S′ $=$ the next succeeding Term in the Series to the *last*, or the Increment of S when the Number of Terms are $x + 1$. Then because the first Term and common Difference are each Unity, $x + 1 = \sqrt{S}$ which in the Series $xx\,x'x''$ &c. answers to x ∴ S $=$ $\frac{xx\,x'x''}{x'''}$

xx, or $xx+x$, Whence $S=\frac{xxx}{3}+\frac{xx}{2}=$ by Subſtitution $\frac{x+1\times x-1\times x}{3}+\frac{x\times x+1}{2}=\frac{1}{3}x^3+\frac{1}{2}x^2+\frac{1}{6}x$.

Q. E. F.

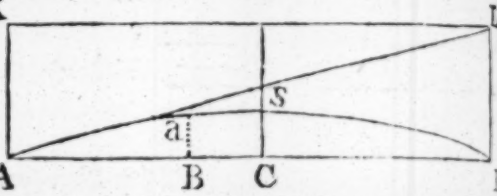
Anſwer'd by *Bironnos*.

Let $Ax^{n+1}+Bx^n+Cx^{n-1}+Dx^{n-2}$ &c. $\ldots\ldots+L=1^n+2^n+3^n$ &c. to x^n; then will $A\overline{x+1}^{n+1}+B\overline{x+1}^n+C\overline{x+1}^{n-1}$ &c. $\ldots\ldots+L=1^n+2^n+3^n$ &c. to $x^n+\overline{x+1}^n$, from which ſub. the former and there remains $A\times\overline{x+1}^{n+1}-x^{n+1}+B\times\overline{x+1}^n-x^n+C\times\overline{x+1}^{n-1}-x^{n-1}$ &c. $=\overline{x+1}^n$. By expanding the ſeveral Powers of $x+1$ we get $A=\frac{1}{n+1}$, $B=\frac{1}{2}$, $C=\frac{n}{3.4}$, $D=0$, $E=\frac{n\times n-1\times n-2}{2.3.4.5.6.}$. Conſequently $1^n+2^n+3^n$ &c. $=\frac{x^{n+1}}{n+1}+\frac{x^n}{2}+\frac{nx^{n-1}}{3.4}-\frac{n\times n-1\times n-2}{2.3.4.5.6.}x^{n-3}$ &c.

Which when $n=2$ will become $\frac{2x^3+3x^2+x}{6}$ the Theorem requir'd.

This Queſtion was anſwer'd by Mr. *Farrer*, Mr. *Jepſon*, Mr. *Peter Wood*, Mr. *Arch. Scythe*, Mr. *Landen*, Mr. *J. Aſh*, Mr. *Williams*, and laſtly by Mr. *Heath* in an elegant and general Manner.

Queſtion 259 anſwer'd by Mr. *N Farrer.*



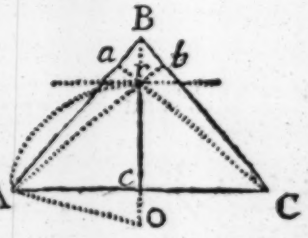
Let ASD repreſent the Path of the *Projectile*, thrown from A, with a Velocity that will carry it in a perpendicular Aſcent to K; or in the Direction AL, to L, and let this Celerity carry it thro' the Diſtance d in the Time u, and the Diſtance run thro' by a falling Body in the Time $= w$, Put any Diſtance A B $= y$, s and e the Sine and Cof. of the L of Direction LAD; then will $\frac{sdu}{de}$ be the Time in which the *Projectile* runs thro' the Curve A a, and $w \times \frac{sdu}{de}\Big|^2$ the Diſtance deſcended by a heavy Body in the Time $\therefore$ B $a = \frac{sed^2y - wy^2}{d^2e^2}$, and when this $=$ C S the $y = \frac{sed^2}{2w}$, the Time of Deſcription $= \frac{sdu}{w}$; Put 1142 the Feet ſound moves in 1 Second $= q$, then $q : 1 :: \frac{sed^2}{w} : \frac{sdu}{w}$ $\therefore d = \frac{qu}{e}$; Conſequently $\frac{sq^2u^2}{ew}$ — the required Diſtances. Now let $u = 1''$, then $w = 16\frac{1}{12}$ Feet. Hence A D $=$ 20895,106 Feet $=$ 3 M. 7 F. 21 P. and 2 Yards nearly, and the Time of Deſcription $\frac{sdu}{w} =$ 18,29 Seconds.

Mr. *Tho. Cowper*'s Anſwer.

Let AL be the Line of Direction, and AD the Diſtance of the Perſon from the Place of Projection. Put $t =$ Tangent of the L DAL, $d =$ 16 F. $\frac{1}{12}$, the perpendicular Deſcent of heavy Bodies in 1 Second, $b =$ 1142 F. the Velocity of Sound in the ſame Time; and $x =$ the Time the *Ball* was in Motion; Then $bx =$ AD, and $dx^2 =$ DL; But as $1 : t :: bx : tbx =$ DL $\therefore x = \frac{tb}{d}$; hence $\frac{tbb}{d} =$ AD $=$ 20945,76 Feet, the Diſtance ſought.

This Queſtion was ſolv'd by Mr. *Heath*, Mr. *Powle*, Mr. *Jeſſop*, Mr. *Bamfield*, Mr. *Davies*, Mr. *Terey*, *Bironnos*, Mr. *Williams*, Mr. *T. Garrard*, Mr. *J. Aſh*, and Mr. *Landen* the Propoſer.

Queſt. 260 ſolv'd by Mr. *Heath*.



It is evident by the *Data* that the Δ muſt be Iſoſceles. In the Δ ABC, the $\angle A = \angle C$, or the $\angle B$ muſt be the given $\angle$; and either Way the $\angle ArB = \angle CrB$, or $\angle ArC$ is given $= 101° 15$ oppoſite to the Side given 20 Chains, on which deſcribing a Segment of a Circle to contain it, and drawing the parallel Diſtance 8,19 (or rather 8,2 as it ſhould be) Chains $= cr$, and it will be found a *Maximum* (as is alſo prov'd by Trigonometry) therefore the *Data* are rc, $Ac = cC$, and $\angle B$, $\angle A = \angle C$, and $\angle BAb$; whence follow by Trigonometry $Ar = Cr = 12,925$, $ar = rb = 2,5215$ (AB = BC = 15,64) Chains, required.

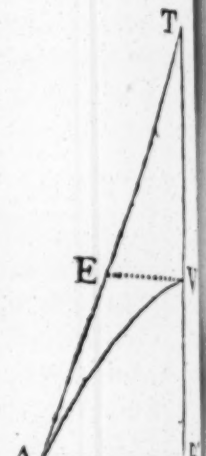
Queſt. 261. anſwer'd by Mr. N. FARRER.

Given $\frac{\sqrt[2]{aaa} + \sqrt[4]{aaa} - \sqrt[3]{aa}}{b} = a$; In which write $y^{12} = a$ and it is $y^{10} + y - 640.625y^4 + 1 = 0$, whence $y = 2,936056$ and $y^{12} = a = 410367$, from which ſub. $16b = 10250$ and there remains 400117 Miles $= 6668° 37'$, from which ſub. $360 \times 18 = 6480.° 0'.$ and there remains $188.° 37'.$ Hence $188.° 37.' - 180.° 0.' = 8° 37'.$ S. the Latitude of the Southermoſt Pond; which taken from $85° 25'.$ leaves $76° 48'.$ N. the Latitude of the Northermoſt. In Lat. $8°. 37'.$ S. Sun's Depreſſion $= 34°. 35'.$ Continuance under the Horizon 8 H. 48 M. In Lat. $76° 48'.$ N. Sun's Depreſſion $= 27.48$ Continuance under the Horizon 91 Days; And ſuppoſing the Intenſity of Cold, as the Sines of the Sun's Depreſſion, multiplied by the Time of his Continuance under the Horizon, and the Solidity or Thickneſs of Ice, in the ſubtriplicate Ratio thereof, We have

$\sqrt[3]{,2081} : \sqrt[3]{42,441} :: (,5926 : 3,488 ::)$ 6 Inches : 35,31 In. the Thickneſs of the Ice of the Northermoſt Pond.

Queſtion 262. anſwer'd.

Here is given the Equation of the Curve $x^5 - y^5 + axy =$

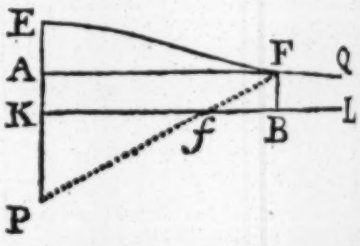


Let $zx = y$, then $x = \sqrt[3]{\frac{az}{z^5-1}}$, $y =$ $\sqrt[3]{\frac{az^4}{z^5-1}}$ and $\frac{\dot{y}x}{\dot{y}} = BT =$ $\frac{4z^5+1}{z^5+4}\sqrt[3]{\frac{az}{z^5-1}}$ $\therefore VT = \frac{4z^5+1}{z^5+4}$ $-1 \times \sqrt[3]{\frac{az}{z^5-1}}$, and when the flowing Quantity becomes infinite, the Tangent AT will become an Aſymptote, in which Caſe $VT = 4\sqrt[3]{\frac{a}{z^4}}$, and $\dot{x} : \dot{y} :: 1 + 4z^5 : 4 + 5z^5$ $:: VT : EV = \frac{16+4z^5}{1+4z^5}\sqrt[3]{\frac{a}{z^4}}$; hence the Poſition of the Aſymptote is determined.

N. Farrer.

Queſtion 263 anſwered by Mr. *Heath*.

To rectify the *Conchoid* of *Nichomedes* generally.



Let $b = PK$, $a = KE$ $(= b = 20)$ $y =$ AF any *Ordinate*, and $x = FB = AK$, Then becauſe f F is always equal to KE, $AF = \frac{b+x}{x}\sqrt{a^2-x^2}$, and $AE = a-x$, its correſponding *Abſciſſa*. In Fluxions $-\dot{x} \times \frac{x^3 + ba^2}{x^2\sqrt{a^2-x^2}} = \dot{y}$, whence

$\sqrt{\dot{y}\dot{y}+\dot{x}\dot{x}} = a x^{-2}\dot{x} \times \overline{b^2a^2+2bx^3+x^4}\Big|^{\frac{1}{2}} \times \overline{a^2-x^2}^{-\frac{1}{2}}$

$= a x^{-2}\dot{x} \times ba + \frac{x^3}{a} + \frac{x^4}{2ba} - \frac{x^6}{2ba^3}$ &c. $\times \frac{1}{a} + \frac{x^2}{2a^3}$

$+ \frac{3x^4}{8a^5}$ &c. the Fluent of which Terms collected is $\frac{bx}{2a} +$

$\frac{x^2}{2a} + \frac{x^3}{6ba} + \frac{bx^3}{8a^3} + \frac{x^4}{8a^3} + \frac{x^6}{16a^5}$ &c. $- \frac{ba}{x} - \frac{x^5}{20ba^3}$

$- \frac{x^7}{112ba^5} - \frac{2x^9}{144a^7}$ &c. but when $y = 60$, $x = 8.6$ *ferè*; consequently when $-x$ in the corresponding *Abscissa* $= 8,6$, or $x = -8.6$ then the Fluent or Curve $= 43.4$; but when $x = a$, and $x = -a$ in the *Abscissa*, the Fluent or Curve $= 19.6$ which added to the former is 63 *fere*, the Length of the Curve requir'd.

The 185th, or 264th Question solv'd by Mr. *Heath*.

By the Equation of the Curve $axx = y^3$ (a being as yet unknown, but consider'd as fixt) we get $\sqrt{\overline{xx+yy}} = \dot{y}\sqrt{\frac{9y+4a}{4a}}$ for the Fluxion of the Curve, whose Fluent (corrected) is $\frac{8a}{27} \times \sqrt{\frac{9y+4a}{4a}} : - \frac{8a}{27} = c = 50$. Whence

$a^3 + \frac{27c^3 - 36y^2}{16 \times c-y}\, a = \frac{27y^3}{16 \times c-y}$. And

$$a = \frac{\sqrt{27 \times 64c^3 - 16y^4 - 72c^2y + 27c^4} : + 36y^2 - 27c^2}{32 \times c-y}.$$

The Fluxion of the Area of the Semi Parabola $= yx = \frac{3y^{\frac{5}{2}}}{2a^{\frac{1}{2}}}\dot{y}$ whose Fluent $\frac{3}{5} \times \left|\frac{y^5}{a}\right|^{\frac{1}{2}}$ must be a *Maximum*, and consequently $\frac{y^5}{a}$; Therefore

$$\frac{c^5 - 16}{\sqrt{3 \times 64c^3 - 16y^4 - 72c^2y^2 + 27c^4} : + 12y^2 - 9c^2}$$ will

be

be a *Maximum*. Put into Fluxions.

$$5c - 6y \sqrt{3 \times 64cy^3 - 16y^4 - 72c^2y^2 + 27c^4} : + 12y - 9$$
$$3 \times 96cy^2 - 32y^3 - 72c^2y.$$

minus $\sqrt{3 \times 64cy^3 - 16y^4 - 72c^2y^2 + 27c^4} + 24y \times cy - y^4 =$

here $y = 34{,}89$ by a new Method of solving Equations, and consequently $a = 35{,}543$ *fere*, and the Area of the whole *Parabola* form'd thereby, (which is now the greatest) 1447,4 *fere*. In answer to the Objections by *Amicus*, a in the Equation, is as much a variable Quantity as x or y, till it is determined *. And in the Equation

$$\frac{8a}{27} \times \sqrt{\frac{9y + 4a}{4a}} : - \frac{8a}{27} = c$$

(where $y = a^{\frac{1}{3}} \times \overline{27c + 8a}|^{\frac{2}{3}} : - 4a$) it has a variable Relation to y, when $\frac{y^5}{a}$ or $\frac{y}{a^{\frac{1}{5}}}$ is to be determin'd a *Maximum*; and substituting this Way for the Value of y,

$$\frac{a^{\frac{1}{3}} \times \overline{27c + 8a}|^{\frac{2}{3}} : - 4a}{9a^{\frac{1}{3}}},$$ or $a^{\frac{2}{5}} \times \overline{27c + 8a}|^{\frac{2}{3}} : - 4a^{\frac{4}{5}}$,

will as properly express the *Maximum*, as if it had been denoted by Relative y; hence by making the Fluxion of it $= o$, we get by Reduction $a^2 - \frac{9c}{16} a = \frac{27c^2}{16|^2}$, where the Value of $a = \frac{3c\sqrt{21} : + 9c}{32} = 35{,}5433$ &c. whence $y = 34{,}8909$ &c. and $\frac{6y^{\frac{5}{2}}}{5a^{\frac{1}{2}}} = 1447{,}4001$, the Area of the greatest *Parabolic Space*, as before. Also when $c = 10$, then $x = 6{,}913$, $y = 6{,}978$ and $a = 7{,}1087$ &c. And when $c = 1000$ $x = 691.3$ $y = 697{,}82$ and $a = 710{,}87$ by which it is prov'd that when the Figure is a *Maximum*, the *Abscissa*

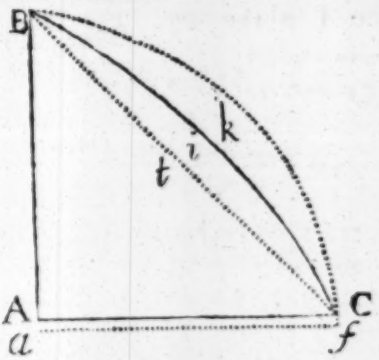
N. B. a may be called a *variable fix'd Quantity*, as partaking of the Nature of Both in it's Operations: for if it was presently determin'd or given, the Question cou'd have no *Maximum*, but a fixt Area

and *Ordinate* will be nearly equal.

In the preſent Caſe, where $c = 50$, let $x = y$, then the Equation $axx = y^3$ becomes $axx = xxy$ when the *Semi-Parabola* is nearly the greateſt; and conſequently $a = y = x$, at that Time,

$$= \frac{27c}{13\frac{1}{2} - 8} = 34.7292 \text{ \&c.}$$

from what is done above.



Whence 1447.34 will be the *Area* of the *Parabola* very nearly a *Maximum*. And therefore in all Queſtions of this Nature the *Area* may be computed by taking the *Ordinates*, and *Abſciſſas* equal: the Error being inconſiderable in the *Maximum*. Draw the *Parabola* ABiCA correct, and it will approach the Form of a Quadrant $aBkCfa$, as near as the Inequality of the Curves iC permits; and its Double will ever be inſcribed in a *Segment* of a Circle ſomething leſs than a *Semi-Circle*: but if the Point C be made to paſs thro' f, it will be inſcribed exactly in a *Semi-Circle*, and the Area of the *Semi Space* ABiCA will vary from the true *Maximum*, but by an exceeding ſmall Quantity, as is evident *per Figure*. When ABkCA is a *Maximum*, the Space ABtCA, or Δ ABC is a *Maximum*, which is when AB = AC, for by the Equation

$x = \frac{y^{\frac{3}{2}}}{a^{\frac{1}{2}}}$, and $yx = \frac{y^{\frac{5}{2}}}{a^{\frac{1}{2}}}$ or $\frac{y^5}{a}$ is a *Maximum* as prov'd before: but ſince the Relation of y and a can be only had from the Rectification of the Curve BiC, and it's Equation with the Length of Curvature given, the Inequality of the *(Fiddleſtick)* Space BiCtB, or unequal Curvature of BiC, involves a Neceſſity of ſome little Inequality betwixt AB and AC, when ABiCA is moſt capacious.

The *Prize Queſtion* anſwer'd.

Projecting the Curve A m n G, which is eaſily done by making $y = 1, 2, 3, 4, 5$, \&c. and thence finding the x s by the Equation $\frac{y^y}{1000000} = x$, Whence it will appear that



when

when the *Semi-Bung* Diameter $y=7$ Inches, that x will but ,823543 which the Half Length of the Caſk ſhould taken out of, and proves an Anſwer to be impoſſible: b correcting the *Data*, and making the Sem. Bung Dia $y=8=BG$, then x 16,777216 $=AB$, whence taki 15.9535 (or 15.953673) the Semi Length of the Caſk, there remains ,823543$=Aa$, whence $am=7$ Inches, the Head Diameter $=14$, Bung Diam. $=16$, and Leng 31,907346 Inches, and being near to the Form of a Cy der, the *mean Diam.* $=15$ Inches, and Content of the Sem Caſk by the Rotation of $BoamnG$ about $aoB=2819$, &c. or 10 A. G. and the whole Caſk 20 Gallons.

Thoſe who have a mind to correct a Decimal may $7+v=y$ and $m=1000000$, then $\frac{\overline{7+v}|^{7+v}}{m}=x$;

Logarithms $l:\overline{7+v}\times 7+v$ *min.* $l:m=l:x$. in Fluxions (

ſubſtituting for the Value of x) $\frac{\dot{v}\times 1+l:7+v\ \overline{7+v}^{7+v}}{m}=\dot{x}$, and

(*a*)

$$3,1416y^2\dot{x}=\dot{v}\times ma\overline{7+v}^{2}+ma\overline{7+v}^{2}\,l:\overline{7+v}=$$

$$\dot{v}\times ma\overline{7+v}^{-5-v}+ma\overline{7+v}^{-5-v}\,l:7+v=\text{Fluxion}$$

of the *Indefinite Solid* by the Rotation of $oamn$ about a whoſe Fluent (by *Series*) will give the Content of the *Semi-Cy* when ($v=1$) nearly as before.

Rob. Heath.

New Ænigmas, to be anſwered in the next Diary.

1. Ænigma 276. by Mr. *Ralph Hulſe.*

Ladies,

MAY he who form'd you firſt as Angels fair,
Your nobleſt Thoughts a ſpotleſs Offſpring ſhare;
With ſmiling Aſpect eye the Sylvan Scene,
At ſight of which is loſt the Senſe of Pain.

How

How fair the Object where ſuch Tranſports glide!
And Nature dances in my youthful Pride:
Deſpair and Doubt no more eclipſe the Day,
But ev'ry Path appears as *April* gay.
Fancy looks briſk plac'd in the Chair of Joy!
And bright Ideas all the Thoughts employ!
The Spleen ſubſides——dull Paſſion's lull'd aſleep,
Celeſtial Joys the frowning Viſage ſweep!
Inſpir'd and charm'd, the Spirits leap——and bound,
From Pulſe to Pulſe th' enliv'ning Joy goes round:
The mountain Ills of Fancy wing away,
And now the Heav'ns their *genial* Form diſplay,
On the whole Frame of Nature Joy o'erflows,
And on the Limbs eternal Health beſtows.
Thus the refin'd (as *Seraphs* bleſt above)
Still revel in th' Extremes of *Peace* and *Love*,
All that the moſt exerted Thoughts can reach,
When ſublimated to it's utmoſt Stretch!
By which the *Britiſh Fair* may ſolve my Name
And ſhew to what a Title I lay claim!
May *They* with ſuch a Bleſſing be poſſeſs'd
— On Earth's fair Orb,—and when they quit it bleſs'd.

II. *Ænigma* 277. By Mr. *William Chapple.*

As a Necklace of Beads whence the Luſtre proceeds
By the Ladies is commonly worn;
So we, you muſt know, for Ages ago
Us'd the Neck of a Bull to adorn.
'Tis unſeemly you'll ſay, that ſuch Jewels as we,
Shou'd be worn by a cornuted Beaſt;
Since (Thanks to Man's Folly) we once were thought holy,
'Till our Number of late Years increas'd.
We have oft' with the Cock regulated the Clock,
Tho' like him your Repoſe ne'er alarm;
Of old in the Night we did Sailors affright,
Yet 'tis certain we meant them no Harm.
To ſome of our Tribe grave Authors aſcribe
A great deal of Learning and Merit;

Who were fam'd for their Wit, and Greek Poetry writ
With Elegance, Judgment and Spirit.
But Men are to blame to make uſe of our Name,
Their own fancied Worth to diſplay;
For we never could write, but like Link-boys give Light
To direct a whole Troop in their Way.
What ever we are, 'tis certain we were
By the ignorant Ancients ador'd
And our Influence and Worth is clearly ſet forth
In undoubted authentick Record.

III. *Ænigma* 278. By Mr. *John Stewart.*

Ye lovely *Fair*, who dwell within our Iſles,
And cheriſh Wit by your enliv'ning Smiles,
Say who I am, for know my ſtern Commands
Nor Brutes, nor lordly Man himſelf withſtands:
Extortioner to all, alike unkind,
Slave to the Senſe, but Rebel to the Mind:
All Appetites to me, all Paſſions yield,
And Reaſon quits the ſcarce diſputed Field;
Her Throne uſurp'd Companions of my State,
Stinging Diſgrace and vengeful Fury wait.
My Pow'r the winged Songſter's Flight o'ertakes,
And drives the *Lion* roaring thro' the Brakes;
Provok'd by me the rav'nous *Wolf* will ſtray,
And over diſtant Hills purſue his Way:
The tim'rous *Hare* thereby will take her Flight,
Forſake her Home, and dance the Fields at Night.
I drive the *Serpent* thro' the mazy Way,
And o'er the *reptile World* aſſert my Sway.
Anon I dive to *liquid Worlds* below,
The watry Kinds my greateſt Fury know;
There various Deaths my fierce Emotions wait.
On Earth I trifle, but when *There* I'm Fate.
Now in the Records of this Book of *Fame*,
I aſk ye, *Ladies*, to inſert my Name.

IV. *Ænigma*

IV. *Ænigma* 278. By *Chriſtopher Maſon.*

My Kingdom is where Mankind dreads to come,
Who ſtill forget that its their native Home.
In peaceful Solitude I moſt delight,
For my chief Work is in the ſilent Night.
No Feuds nor Inſurrection cauſe me Woe,
But Inundations work my Overthrow.
My native Innocence I ſtill retain,
Nor Pride, nor Luxury, e'er bring me Pain.
Moſt in their Modes do vary more or leſs;
Like the grave *Spaniard* I ne'er change my Dreſs.
When War-like Troops againſt ſtrong Holds appear,
Thoſe Holds impregnable to *Engineer*
My Skill is us'd, as premier *Pioneer*.
But oftentimes to fruſtrate my Deſign,
My Works the Enemy doth countermine:
A Priſ'ner made, then put to Death, what's worſe,
My *Robe* converted to a *venal* Purſe,
Or hung in Chains, which is a greater Curſe.
I'll ſpeak what you're to ſay, you'll gueſs our Want;
Tell what I've told, and my Requeſt you grant.

V. *Ænigma* 280. By *Anonymous.*

Aſſiſt me, all ye *Nine* bright Laſſes,
Daughters of *Jove*, Nymphs of *Parnaſſus!*
If I a Riddle may compile,
To pleaſe the *Fair Ones* of this Iſle.
Emblem of their Sex am I,
Snowy Neck and ſparkling Eye;
In my Eye the greateſt Grace,
Before the beſt of Kings take Place;
Who Metals by my Power ſubdue,
His *L*———*p* ſerve and *Vulcan* too.
Various is my Bulk in Thrall,
Big like *Beſs*, or *Tom Thumb* ſmall;
Often fair and often tender,
Taper, fine, ſleek, ſmooth and ſlender;

Like

Like *Flora* deckt with faireſt Flow'rs,
Like *Phœbus* Guardian of the Hours;
But whatever be my Dreſs,
Greater be my Size or leſs:
Clouded if my Aſpect's ſeen,
As *Cynthia* wan, or Lizard green!
Soon or late my Date is done,
As my Thread of Life is ſpun;
Yet to cut my fatal Thread,
Oft' revives my ſinking Head;
Yet I periſh in my Prime,
Seldom by the Death of Time;
Die like Lovers as they gaze,
Die for thoſe I ſeek to pleaſe;
Pine unpitied to my Urn,
Tho' Martyr-like at Stake ſore burn: -
Tho ſeldom ſeen when *Sol* gives Light,
With Pleaſure ſhew my Head at Night;
For then a Lady may diſcover,
The *hidden* Charm unto her Lover.

VI. *Ænigma* 281. By *Ralph Riddler.*

We're old as human Race; but ſhapeleſs then,
Children of Air we firſt convers'd with Men;
No ſooner born than dead, till ſome kind Sage
Taught us to live thro' many a diſtant Age;
In magic Chains our phantom Form confin'd,
Gave Limbs to Air, and fixt the fleeting Wind.
A num'rous Progeny our Mother bore
Painleſs; and Females all, at leaſt a Score.
Forward and pert a few, as ſoon as come
To Life we ſpoke; the reſt alas! were dumb.
But we kind prattling Siſters ſoon unbound
Their fetter'd Tongues, and gave them Voice and Sound.
Of Arts and Science Miſtreſſes we teach
Lay-Clerks to ſing, and hallow'd Ones to preach:
As Fancy dictates, Verſe or Proſe indite;
Taught *Booth* to ſpeak, and *Congreve's* Pen to write.

First with good Senſe the *claſſic* Page we fill;
Then mangle't all with piddling critic Skill.
Numbers we ſcan; in *Euclid*'s Circles tread,
And round the *Planets* Orb great *Newton* led.
Does this perplex? attend one Myſtery more;
The Firſt and Laſt-born of our Race explore,
We tell the Name that *Seraphims* adore.

VII. ÆNIGMA 282. *By* HIMATIORAPTICOS.

SAY what you will of others Shape and Birth,
'Tis I'm the meereſt Monſter on the Earth:
Still-born, dry-nurs'd, yet at a Quarter old
Can ſerve myſelf, fight, run about, and ſcold;
Yet, as I older, I more monſtrous grow,
And ripe of Age I am a perfect Shew
My Head and Beard are of a fiery Hue,
My Coat's like *Joſeph*'s, white, red, black and blue;
A *Piccadillo* round my Neck I wear,
Which ſtares thro' Choller, and contracts thro' Fear:
A Claw like *Neb'chadnezzar* for each Nail
I've got; *Old Nick*, or *Satyr-like*, a Tail:
My Legs are ſcaly Serpents arm'd with Stings,
Which deal out ſudden Death—Oh dreadful Things!
So daring, fierce, and frightful I appear,
That *Lybian* Lions tremble when I'm near,
Ghoſts, Fiends and Devils fly, ſoon as my Voice they hear.
As to my Nature, I'm revengeful, proud,
Impatient of a Rival, luſtful, loud:
My Luſt and Spight are in my Actions ſhewn;
Tho' I've a great *Seraglio* of my own,
Yet I (like *David*) ſeek my Neighbour's Life,
That I might wanton with his only Wife.
But ſtill my Bed I unpolluted keep,
Do nothing there but only preach or ſleep;
And, tho' I'm wicked, yet my Preaching made
A greater Convert than e'er *Wh—f—d* had.
Pardon me, *Ladies*, while I name this Sight,
I ne'er take off my Breeches but to fight.

VIII. ÆNIGMA 283. *By* RESTATIUS.

LADIES, to you I for my Name appeal,
Who can with Eaſe deep Myſteries reveal.
As to my Age, if you had never heard,
You'd think me ancient by my hoary Beard;
Yet my Exiſtence will ſo ſhort appear,
I never yet was known to live a Year;
Unleſs in Climates far from *Britain*'s Shore,
Where I have liv'd for Ages heretofore.

My Qualities I am aſham'd to tell,
Leſt you ſhould deem me Inſtrument of Hell,
So barbarouſly cruel, that, when told,
Nero will ſeem leſs Tyrant than of old;
When I, by lawleſs Rage impell'd, preſide,
Millions of Creatures by my Pow'r have dy'd;
Nor yet am I blood-thirſty, when I kill,
Altho' my Stroke's ſevere, no Blood I ſpill.
At my Approach I make the ſtouteſt yield,
And cauſe whole Armies ſoon to quit the Field;
The boldeſt *Heroes* cannot ſtop my Courſe,
Ev'n *Marlb'ro*'s Self has trembled at my Force.
I *England*'s Commerce ſtop, when ſtrongeſt reign,
More than the Privateers of *France* or *Spain*.
Ladies, perhaps you'll think I've ſaid enough,
Yet one Word more——tho' I am hard and rough,
Your *lovely Shapes*, and *matchleſs Mien*, have Charms
To overcome me in your circling Arms:
But 'tis your Nature to admire me moſt,
When I by Abſence from you would be loſt;
Then you command (when my full Pow'r's diſplay'd)
That I to ſome cloſe Dungeon be convey'd,
And when from thence I'm for your Pleaſure freed,
I ſoon flee from you with with reſiſtleſs Speed.

New MATHEMATICAL QUESTIONS,
To be anſwer'd in the next Year's DIAR

I. QUESTION 265. *By Mr.* HEATH.

Myſterious Things we always find
Are moſt amuſing to Mankind;
When once familiar they appear,
We look for more another Year.
Juſt ſo when Men are plainly known,
We're weary of Acquaintance grown;
We hug the *Strange*, and leave the *True*,
And ſtill are ſeeking ſomething *New*.
Ladies, how comes this ſtrange Inconſtancy,
So viſible in you, as well as me.

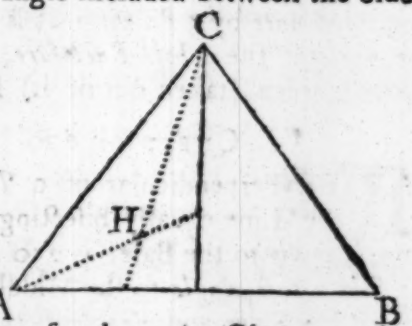
The QUESTION.

IF the hind Wheel of a *Coach* be ſeven Feet in Diameter, and a drove into the Middle of the Spoke (or *Radius*) ſtanding Ground, and a *Nail* touch the Ground at the End of the ſa (or *Radius*) when the Coach ſets out to travel; *Quere* how ma will the *Tack* and *Nail* travel reſpectively in driving the Coa

to *Exeter*; allowing the Diſtance between thoſe two *Places* to be iles? What will be the Nature of the *Curves* they deſcribe? And oſition, or Height of *Tack* and *Nail* from the Ground, at the End Journey?

II. QUESTION 266. *By Mr.* FARRER.

rveying a triangular *Field* ABC, and ſtanding at the Corner C, I took the Angle included between the Side nd a Line drawn from ngle C, to a *Houſe* ſi- within the *Field*, and it 78° 10′. I then ded to meaſure the t Diſtance to the op- Side AB, and having ed 20 *Chains*, I ob- the *Houſe* and the An- in a right Line; then meaſured on 10 *Chains* to the B: I likewiſe obſerv'd the Sides AC and BC were and the *Houſe* equally diſtant from the Angles A and *Quere* the *Area* of the *Field*?



III. QUESTION 267. *By Mr.* POWLE.

IVEN $35x + 43y + 55z = 4000$, to find all the poſſible Values of x, y, z, in whole Numbers, and to e Method of Inveſtigation?

IV. QUESTION 268. *By* FORTUNATUS.

T the *Sorts of Faces* to be thrown on ſeven Dice by our Perſons, at a ſingle Throw each, be as follow; *viz.* a^4bcd; by B, a^2bcdef; by C, $a^2b^2c^2d$; by D, ; *Quere* their reſpective Chances of winning? And hrow, as to *Sorts of Faces*, has the greateſt Number of s for coming up, at a ſingle Throw, of all the Sorts can be thrown on the ſaid Number of Dice?

The Number of the *ſame* and *different* Letters repreſent ſo many he *ſame* and *different* Sorts of Faces, *viz.* ſo many *Aces*, *Duces*, *Caters*, &c. of the ſame and different Sorts.

V. QUESTION 269. *By Mr.* J. ASH.

A Gentleman has a *Piece of Ground*, whoſe three Sides an *Abſciſſa*, *Sem. Ordinate*, and *Curve*, the Equation of which is $ax=y^3$; he has taken from thence the biggeſt *long Garden* which he could poſſibly encloſe, whoſe *Area* 141,84243 Poles; and he finds the *Abſciſſa* longer than the *Sem. Ordinate* by 5 Poles. It is required from thence to find the *Area* of the *whole Encloſure*, its *Perimeter*, and the Sides of the Garden (taken out of it) ſeparately?

VI. QUESTION 270. *By* RHINOCEROS.

THE Perpendicular of a *Triangular Field* is 200 Poles, the Line equally biſecting the Angle oppoſite to the Baſe, drawn to the Baſe, is 250 Poles, and the Diſtance from the ſaid *obtuſe Angle* to the Middle of the Baſe is 295 Poles. *Quere* the Sides and *Area* of that triangular *Field*, with a *Geometrical Conſtruction* of the ſame?

VII. QUESTION 271. *By Mr.* CHRISTOPHER MA

LATELY young *Chloe* ſtruggling to be coy,
And ſtill prolong her *Strephon*'s wiſh'd-for Joy,
Did artfully a Stratagem contrive,
To ſtint herſelf, her *Strephon* ſtill deprive:
But he yet preſſing with the urgent *When*
Shou'd he be made the *happieſt* of Men;
Your *When* quoth ſhe (if you can make't appear)
That Night the *Twilight*'s ſhorteſt in the Year.
Pray lend your Aid the *nuptial Night* to fix;
The Latitude is fifty, forty-ſix. *i. e.* 50° 46′

VIII. QUESTION 272. *By* F. R. S.

IN what Law of Gravity will a *Projectile* deſcribe a Curve expreſs'd by the Equation $ax^2=y^5$, in a non-reſiſting *Medium?*

IX. QUESTION 273. *By Mr.* FARRER.

QUERE the *Area* of a right-angled Triangle whoſe *Hypothenuſe* is x^{3x}, and the two *Legs* x^{2x} and x^{x}?

X. Que

X. QUESTION 274. *By Mr.* CLARKE.

THE Thickneſs of a *Ring* belonging to a *Ship*'s *Anchor* is nine Inches in Circumference, and the outward Circumference ſhewing the *Width* of that *Ring* is 50 Inches; what the *ſolid Content*, and *Weight* thereof?

XI. QUESTION 275. *By* FILIUS DIOPHANTI.

TO find *three Numbers*, that when *each* is ſubtracted from the Cube of their Sum, a *Cube Number* ſhall remain?

XII. QUESTION 276. *By Mr.* J. LANDEN.

It is required to find the *periodic Time* of a *Pendulum* deſcribing a *conical Surface*; the perpendicular Height of the deſcribed *Cone* being 200 Inches?

XIII. QUESTION 277. *By* CROCUS METALLORUM.

WHAT *Annuity*, to continue as many *Years* as its Pounds, can I purchaſe for the Square of its Pounds *Money*, allowing me £ 5 *per Cent. per Ann.* compound Intereſt for my Bargain?

XIV. QUESTION 278. *By* HURLOTHUNDRO.

REquired the *Ratio* of the Diameter of the *Bore* to the *Length* of a Piece of Cannon (or other Fire-Arms) to make it capable of throwing a Ball the *fartheſt poſſible*; ſuppoſing the Diameter of the *Ball* nearly equal to the Diameter of the *Bore*, with a proportionable Weight of *Powder*, and the Metal of the Piece form'd ſufficient to ſuſtain the Effect?

The PARADOX *in the laſt Year's* DIARY *anſwer'd.*

SINCE the *Velocity* of the Fluid is always in the *ſubduplicate Ratio* of the Height of its Surface above the Hole; 'tis evident that when *that Height* is infinitely ſmall, the Velocity muſt be ſo too, *i, e.* in Effect, *Nothing*: Conſequently, the Water can never be exhauſted. *Tho. Sparrow.*

The PRIZE *ÆNIGMA*, PRIZE *QUESTION*.

Whoever ſends Anſwers to them before Candlemas *next, ha Chance by Lots to win* 12, 8, *and* 10 Diaries.

Prize Ænigma.

IF *Patriots* who have ſav'd a ſinking State,
And freed their Country from impending Fate,
Immortal Honour have acquir'd thereby,
Both for themſelves, and their Poſterity,
Then even I ſome ſmall Reſpect may claim,
Whoſe *Anceſtors* gain'd *everlaſting Fame*,
By giving careleſs *Rulers* timely Caution
To guard themſelves from Foes, and ſave their *Nation*.
But Deeds *Heroic* by our *Fathers* done,
The *Poet* ſays, we ſcarce can call our own:
Let then the ancient Honours of our Race
To *perſonal* and preſent Worth give Place.
I half a Dozen Younkers ev'ry Year
Nouriſh with more than fond *maternal* Care;
Which ſent into the World, Employments find,
And deal in *Sciences* of every Kind;
To Men of Buſineſs always welcome are,
And ſometimes acceptable to the *Fair*.
The *Commentators* on each written Law,
Derive from me the Fountain whence they flow:
I oft ſupply the Peaſant's Want of *Coin*;
'Tis I that furniſh *Lawyer* and *Divine*
With fit Materials to prolong Diſputes,
Raiſe needleſs Cavils, ſpin out tedious Suits.
In ſhort, 'tis I give Wings to Contemplation,
And arm the *Wits* and *Bards* throughout the *Nation*:
Nay, our Fraternity for Ages ſent
(And ſtill ſend) *Members* to the *Parliament*.
But all my Services are diſregarded,
For mark how generouſſly I'm rewarded;
Tho' a Contributor to every School,
I'm often made the *Emblem* of a Fool;
Treated as ſuch, and, what is worſt of all,
Seiz'd and impriſon'd like a Criminal:
Stript of my All, at length, I ſhed my Blood
In Learning's Cauſe, and for the *Publick Good*.

PRIZE QUESTION. *By Mr.* W. CHAPPLE.

A Gentleman has a Mathematical, or *Circular Garden*, whoſe Diameter is 310 Yards, in which is contain'd a *Circular Pond*, whoſe Diameter is 100 Yards, ſo ſituated in reſpect of each other, that their *Peripheries* will *inſcribe* and *circumſcribe* an infinite Number of Triangles [*i. e.* whoſe Sides will be Tangents to the *Pond*, and Angles in the Fence of the Garden.] He being diſpoſed to make *Encloſures* for different Uſes, and farther Ornaments on his *Scheme* begun, in Order thereto, applies himſelf to the *Artiſts* of *Great Britain* for the Dimenſions of the *greateſt* and *leaſt* Triangles that can be inſcribed and circumſcribed as aforeſaid? and the *neareſt Diſtance* of the Peripheries of *Garden* and *Pond?* and for a *Demonſtration* of the Truth of his Pond's Situation?

PARADOX I. *By* PERIGRINUS AMERICANUS.

THE Wind blew *North*, and *North* ſail'd we;
Both Sheets *aft*: How could that be?

PARADOX II. *By Mr.* HEATH.

A *Wheel* and its *Nave* move together we ſee,
Yet the *Ends* of the Spoke in their *Way* diſagree;
Their trav'lling *together* a *Difference* we find,
Yet one *End* never leaves the *other* behind.
The *Axis* and *Nave* friſk'd it over the * Plain,
Which I leave to you, *Ladies*, next Year to explain.

* *Saliſbury.*

III. PARADOX. *By* ENS GENERANS.

I Proceed by ANOTHER's *Motion*,
Yet that OTHER proceeds by *mine*;
So *variable* (in our Notion)
Yet *fixt*, in Production WE join.

Errors corrected in the laſt Diary.

Page 14, l. 13, for $bb-xx$, r. $b-nx$. P. 16, l. 21, for $\frac{c}{x}\sqrt{1-x^2}+d=\frac{c}{x}\sqrt{1-x^2}$, r. $\frac{c}{x}\sqrt{1-x^2}+d=\sqrt{1-xx}$.

All Perſons who are pleaſed to be CONTRIBUTORS, *by anſwering the* Ænigmas, Queſtions, *&c. in this* Diary; *or ſending New* Ænigmas, Queſtions, Paradoxes, *or other Subjects fitting for this* Work, *are deſired to ſend their* Solutions *with them, before the End of* April, 1746, *directed for the* Author, *at Mr.* Simpſon's, *at* Stationers-Hall, London.

[Poſt-paid.]

Of the IDEA, *and* NATURE OF FLUXIONS.

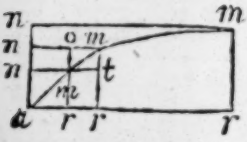
THE Diſtinction betwixt the *Increments* and Fluxions of Magnitudes, has been this; that the *former* approach in *Ratio* infinitely near the *latter*, ſo that their *Difference* is unaſſignable. But in finding the *Fluxion*, or Quantity of Velocity with which a Magnitude is born, or proceeds to be augmented, by multiplying the *variable*, or generating *Line*, or *Plane*, into its Velocity forward, it is but finding the *Velocity in Part*: For at the very Inſtant a Motion commences, and continues in the Generation of a *Parallelogram* or *curvilinear Space*, or Solid, another Motion commences, and continues laterally, which we neglect in computing the *Sum Total* of Motion, with which Magnitudes are born: And therefore what we call the *Fluxions*, or *Velocities* of Magnitudes, are only the Fluxions in Chief, or in Part, with which they are born; the Part neglected in the *Ratio* exactly corresponding with what is rejected in the finite *Ratio* of the infinitely ſmall Increments, which is therefore the ſame as the *Ratio* of our Fluxions. And hence, whether we call the finite *Ratios*, Fluxions, or Increments, their *Idea*, Nature

and Original appear to be the very ſame Thing. For all Things are relative, or refer to others, as Motion refers to other Motion; and that Motion again refers to he *Spaces* which it paſſes over in the ſame Time: Therefore variable and equal Motion is meaſured by the *variable* and equal Increaſes of Space; conſequently, the *Ratio* of Motion. at any Inſtant of Time, of that which is continually variable, and that which is always the ſame, will be expreſs'd by the *infinitely ſmall Increments* of Space paſs'd over together. But in turning this *Ratio* in Infinites into a finite One, ſome Part or Member of it will vaniſh, as being of no ſignificant Value, when compared with the finite Quantities of the *Calculus*. And, if the Property of a Magnitude be given in a finite Equation, the relative Increaſe of Space, or of the whole Magnitude, and its Part, may be determined at any Points of Conſtitution. And the Succeſſions of *Increaſes* being always in a variable *Ratio*, therefore every Magnitude ſo conſtituted, or *born*, in the Language of Fluxions, can be determined thereby, and *vice verſa*: The *Fluxions*, or *Increments*, having a particular *Ratio* amongſt themſelves, and a general Habitude to each of their *Fluents*, or *augmenting Quantities*. Perhaps it may be objected, that ſince all finite Quantities refer to Unity, therefore the given generating *Line*, or *Plane*, (in a variable Parallelogram, curvilinear Space, or Solid) to Unity, will be the *Ratio* of the Fluxions of thoſe Figures, without the Uſe of an Increment to determine them by; and conſequently, if each Side of the *Ratio* be multiplied into the Fluxion $\dot{x}$ of the ſingle Quantity x in that *Ratio*, the Ratio of the Fluxions will ſtand in the Form they are uſed; and proves that a *Line*, or *Plane*, multiplied into ſomething (its Velocity forward) is for the Fluxion, or *Ratio* of the Figure generated thereby; which may therefore be called the *Ratio* of Generation, or Augmentation of Quantities. But it muſt be obſerved, that whilſt we conſider this given *Line*, or *Plane*, of no Breadth or Thickneſs in the Mind, in our Notation we repreſent them by the finite Breadth, and Thickneſs of Unity, and conſequently each *Line* and *Plane* ſhould be expreſs'd by o × L, and o × P, to denote them as they are in the Mind. But L × o to o, and P × o to o, are in the ſame

ſame *Ratio* with L to 1, and P to 1, by equal Diviſion by $\dot{x}$, and thoſe again in the ſame *Ratio* with $L\dot{x}$ to $\dot{x}$, and $P\dot{x}$ to $\dot{x}$, by equal Multiplication by $\dot{x}$, for the Ratio of Fluxions. But, this finite Notation of a *Line*, or *Plane*, which we conſider of no *Breadth*, or *Thickneſs*, and yet denote by Units each, at the ſame Time, makes the *Practice* and our *Comprehenſion* diſagree: As the Uſe of common Words carry us into Confuſion, when our Notions are too intricate for the Explication. So that it will be an Error to conclude that the *Ratio* of the Fluxions of Quantities generated by the Motion of *Lines*, or *Planes*, is arrived at this Way, without the previous Conſideration of an Increment; for the very *Lines* and *Planes* muſt be *Increments*, or *Somethings* next to *Nothing* themſelves, before they were what we finitely expreſs them by Notation, or Quantities could never increaſe or be generated thereby: For to carry a *Line* or *Plane* of no Breadth or Thickneſs forward, is the ſame in Terms as to carry Nothing forward. And therefore the Diſtinction betwixt the Ratio of Increments, and that of Fluxions, is only what the Conception of the Thing differs from that of its Notation in Practice. To make the Idea of Fluxions as clear as poſſible: In the Formation or Generation of Magnitudes, by a continual Increaſe (of their Heights to their Baſes, or otherwiſe) from their firſt Beginnings to the laſt Terminations thereof, whilſt ſome Parts or Lengths increaſe equally, other Parts, and alſo whole Magnitudes, increaſe proportionally *faſter* or *ſlower*; by which Means we get an *Idea* of Motion (which continual Increaſe implies) and the Quantity of it, with which Magnitudes are finally produced. This relative Quantity of Motion, explain'd by the *Ratio* of the *laſt Increaſes*, finally terminating the Magnitudes produced, are called the Fluxions of thoſe Magnitudes which are ſo particularly related to themſelves, and habited to one another, that by the *Magnitude* its Fluxion, and by the *Fluxion* its Magnitude is determinable. In the infinite Variety of *next Increaſes*, or Degrees of Motion by which Magnitudes are continually and finally produced (according to the given Property of the Figure) call'd the firſt *Fluxions*, or Increaſes of Magnitudes, it is evident, that there are *Steps* between theſe ſucceeding *relative Increaſes* (tho'

tho' never ſo near each other) or a Ratio by which any two became the *Next*. Theſe are the *ſecond Fluxions*, or Increaſes of Magnitudes, *ſecond Ratios* of Generation, or *Ratios* of the firſt *Ratios*. So likewiſe there muſt be Steps betwixt theſe *ſecond Increaſes*, or Fluxions, by which each relative *Couple* became the *Next*, or third *Fluxions*, or Increaſes of Magnitudes, third *Ratios* of Generation, or firſt *Ratios* of the Second. And again, there muſt be Steps betwixt theſe *third Fluxions*, or Increaſes (or *Ratios* by which each relative Couple became the *Next*) *Fourth Fluxions*, or Increaſes of Magnitudes, fourth *Ratios* of Generation, or firſt *Ratios* of the third, *&c. ad infinitum.* Where each finite Ratio is determinable by the infinitely *ſmall Increments* of the *Laſt*, or the Rules for finding the firſt *Ratios*, or Fluxions of Magnitudes. The ſecond Fluxion $m \times \overline{m-1}\, x^{m-2} \cdot \dot{x}\, \dot{x}$ of x^m, being the firſt Fluxion of the firſt $mx^{m-1} \cdot \dot{x}$ of x^m; the third Fluxion $m \times \overline{m-1} \times \overline{m-2}\, x^{m-3} \cdot \dot{x}\, \dot{x}\, \dot{x}$ of x^m, being the firſt of the ſecond. The fourth Fluxion $m \times \overline{m-1} \times \overline{m-2} \times \overline{m-3} x^{m-4} \cdot \dot{x}^4$ of x^m, is the *firſt* of the third Fluxion, *&c.* Whence it is obſervable, that the firſt Fluxion of a *variable Quantity* x^m, is always equal to the *ſecond Term* of the Binomial $x + \dot{x}$, raiſed to the Power m, whole or fractional; and that the 2d, 3d, 4th, &c. Fluxions are in ſome *conſtant Ratio* of the 3d, 4th, 5th, &c. Terms of that *Series*. That no variable Quantity can have a higher Order of Fluxions than the Height of its Power, if it be a whole Number; but, if a fractional one, as many Orders of Fluxions, as there are Terms in the *Series:* And that no Quantity which increaſes or flows equally in the Generation of a Magnitude, whilſt other Quantities continually vary, can have a *ſecond, third, fourth*, &c. Fluxion; becauſe it is the Standard Motion, or Increaſe, to meaſure the other Variations by. Thoſe who deſire farther Satisfaction as to the Nature of Fluxions, of their noble Uſe and tranſcendent Excellence, may conſult Mr. EMERSON's *Doctrine* of the *whole Art*, which is a Book, for its general Uſe and Improvement, the *beſt* of any that I have ſeen extant; as it contains the choiceſt Things, in the ſmalleſt Compaſs,

Compaſs, done in the moſt clear and elegant Manner; a ſtands ſelf-recommended to *Thoſe* who have a Deſire to i prove in the Knowledge and *Art of Fluxions*, which it pe fectly teaches; and *Others*, who having got an *Idea*, ma know how to apply the *Operations*, in the Diſcovery of t moſt ſublime and important Mathematical Truths, whic (like *Diamonds*) lie conceal'd in the hidden Retiremen of Nature's moſt valuable Treaſure. And *laſtly*, accordi to what is done by Mr. EMERSON, and what here offe itſelf to the Examination of the judicious Reader, tho Writers will find themſelves miſtaken, who pretended t derive the finite *Ratios* of Motion, or Fluxions producin Magnitudes, without the previous Conſideration of Incr ments, which include the very Notion of what a Fluxio is. This *ſome* have attempted by multiplying Quan tities into their Velocity, and ſome by other Means, th Reſult of which originally depends on *incremental Principl* if they would conſider the Matter as far as it will go. Fo



let any ▭ (whoſe Sides are in the *Rati* of *an* to *ar*, or x to $y = ax^{\frac{m}{n}}$) begin t form at *a*, at the Meeting of *two Per pendiculars:* Then it is plain, according to the Values of x and y, there will be a certain *proportiona Degree of Increaſe*, or Quantity of Motion, in each forward Direction; by which $nm = ar$, will paſs forward at the Rat of Increaſe, or Motion of $an = mr$; and $mr = an$, will paſ forward at the Rate of Increaſe, or Motion of $ar = nm$, *i. e.* Each Side of the Parallelogram will *generate* with the other's Degree of Increaſe; therefore the *forward Increaſe*, or Fluxion of the Space *amr*, will be the little ▭ *rmtr*; and the *forward Increaſe*, or Fluxion of the Space *anm*, will be the *little* ▭ *nnom*, whoſe *Sum rmtr* + *nnom*, will be the *forward Increaſe*, or Fluxion of the *whole Parallelogram anmr:* But the lateral Increaſe, or Motion of Space *amr*, is the *little curv'd Space mmt*; and the *lateral Increaſe*, or Motion of Space *anm*, is the little curv'd Space *mom*, whoſe Sum, or little ▭ *momt*, is the *lateral Increaſe* or Fluxion neglected, which bears no *finite Proportion* to the forward Degree of Increaſe or Motion; tho' it is *ſomething*, even when *nm* and *mr* firſt begin to move forward or augment, or at the In-

ſtant

ſtant of their Motion. So that if $\dot{x}$ and $\dot{y}$ denote the Fluxions of the Quantities x and y reſpectively, the Fluxion of the *Parallelogram* xy will be always finitely expreſs'd by $x\dot{y} + y\dot{x}$; *the Sum of each Side into the other's Degree of Velocity, or continual Increaſe.* Wherein it muſt be obſerved, that when the Sides of the Parallelogram expreſs'd by $an = x$, and $ar = ax^m$, if a and m be each equal to Unity, then the ▭ deſcribed will be a *Square*. And if a be greater or leſs than Unity, and m be Unity, then one Side will be in ſome *conſtant Ratio* of the other. And in both Caſes, the Point m will deſcribe a *right Line*, or Diagonal of the other two Motions. But, when m is greater than Unity, the Point m will deſcribe a *Curve*, concave to ar; but, if m be leſs than Unity, then the Point m will deſcribe a Curve *convex* to ar, or concave to an, let a be what it will; the *Curve* always bending to the *Axis* of ſwifteſt Motion.

Hence, if $\dot{x}$ be put for the Fluxion of the ſingle Quantity x, then the Fluxion of the ▭ xx will be expreſs'd by $x\dot{x} + x\dot{x} = 2x\dot{x}$ (each Side multiply'd into the other's Degree of Fluxion) and, again, the Fluxion of the ▭ x^3 (whoſe Sides are x and x^2, and Fluxions $\dot{x}$ and $2x\dot{x}$) is $3x^2\dot{x}$, of x^4 (whoſe Sides are x and x^3, and Fluxions $\dot{x}$ and $3x^2\dot{x}$) is $4x^3\dot{x}$, of x^5 (whoſe Sides are x and x^4, and Fluxions $\dot{x}$ and $4x^3\dot{x}$) is $5x^4\dot{x}$, &c. Whence it is obſervable, that the Fluxion of any Power x^m is univerſally $mx^{m-1}\dot{x}$; as may be alſo proved by the *Ratios* of infinitely ſmall Increments, which are the ſame Things.

Scilly Iſlands, near *Penzance*, in *Cornwall*. ROBERT HEATH.

P. S. After what has been ſaid, I obſerve daily, that the *progreſſive*, and *lateral* Flowing of the Tide (or *Sea*) into a *Bay*, or Harbour for Shipping, at once naturally repreſent the *momentary Increaſe*, or *Fluxion* aforeſaid.

An

An Alphabetical Catalogue *of* Contributors *to this* Diary *ſhewing by the Numerical Letters*, i, ii, iii, &c. *which* Ænigmas; *and by* 1, 2, 3, *&c. what* Queſtions, *they anſwered. Æ. Q. and P. denote the ſolving the Prize Ænigma and Queſtion, or propoſing ſome new ones.*

ADRASTEA, all the Ænigmas. Mr. Aſh, 1, 2, 3, 4, P. Mr. W. Bamfield, all Ænig. but vii, and P. 4. Mr. Brown, i, ii, iii, iv, v. Mr. Buckland, i, ii, iii, iv, v, Mr. If. Blinkhorn, i, ii, iii, iv, v, vi, viii. Gr. Miſs Brownſword, Æ. Bironnos, 1, 2, 3, 4, 9. Mr. B. Claridge, i, ii, iii, vi. P. Cantabrienſis, i, ii, iii, iv, vi, Æ. P. Mr. A. Clarke, i, ii, iii, iv, vi, viii. Æ. Mr. Clark, P. J. Chiſlett, i, ii, iii, iv, v, vi. Æ. Celadon, all but vii, ix. Mr. Cheſter, i, ii, iii, iv, v, vi, Æ. Mr. W. Chapple, all Æ. 1, 3, P. Mr. T. Cooper, i, ii, iii, iv, vi, viii. Æ. 4, 5, Eclip. Miſs B. Crew, all Æ. Crocus Metallorum, P. Mr. Davies, i, iii, vi, vii, viii, Fr. Æ. 4. Mr. E. D. i, ii, iii, iv, vi, vii, viii, Æ. Mr. Dunn, all but viii, ix, and Prize, P. Mr. Peter Dutton, i, ii, iii, iv, vi, P. Coll. Dagger, all Æ. Rand. Dodd, all Æ. Mr. Tho. Dodd, i, ii, iii. iv, v, vi, Æ. Mr. J. Eccles, i, ii, iii, iv, v, vi, vii, viii, Æ. Mr. N. Farrer i, ii, iii, iv, vi. 1, 2, 3, 4, 6, 7, 9, P. Eclip. F. R. S. P. Filius Diophanti, P. Fortunatus, P. Mr. T. Grimes, all but viii, ix, and Prize. Mr. Sam. Godier, Æ. Ma. Goodchild, 1, 2, 7, 9, Æ. Mr. George, i, ii, iii, iv, v, vi. Mr. Garrard, 4. Mr. J Gowing, i, ii, iii, iv, vi. Miſs Harper, all Æ. Mr. Geo. Hennerly, all Æ. Mr. Geo. Holford, all Æ. Mr. Ralph Hulſe, all Æ. P. Eclipſes. Mr. Hall, all Æ. Mr. Heath, all Æ. all Q. P. Mr. Dav. Harris, i, ii, iii, iv, vi, Æ. Mr. W. Honnor, i, ii, iii, iv. Eclip. Mr. J. Hollingworth, i, ii, iii, iv, vi, viii. Mr. Jepſon, all Æ. 3. Mrs. Iſabel Knabbs, i, ii, iii, iv, v, vi, viii, Gr. Mrs. J. Lalagen, i, iv, v, vi, vii, viii. Mr. J. Landen, i, ii, iii, iv, v, vi. 1, 3, 4. P. Mr. J. Lucas, i, ii, iii, iv, v. Mr. Leeſon, P. Mr. H. L. i, ii, iii, v, vi, viii. Gr. Mr. W. Mobbs, all Æ. but ix and Prize. Mr. Manwaring, i, ii, iii, vi. Æ. Mr. Manfield, i, ii, iii, iv, vi. Mr. Ch. Maſon, all Æ. P. Oedipus, i, iv, v, vi, vii. Fr. P. Patrizo, P. Perigrinus Americanus, P. Philo-Diary, i, ii, iii, v, vi, viii. P. P. P. Pr. Philomath, P. Mr. Powle, 1, 3, 4. P. Phillida, i. ii, iii, iv, vi. Mr. Pemberton, all but ix. Gr. and Fr. Mr. J. Pierce, P. G. Retford, P. Ralph Rattle, all Æ. Mr. J. R. P. Rhinoceros, P. Sachariſſa, i, ii, iii, iv, v, vi, viii. Fr. Mr. Tho. Saunders, all Æ. Mr. Arch. Scythe, 1, 4. Mr. W. Southold, i, ii, iii, iv, vi. Æ. P. Mr Tho. Sparrow, Par. Eclip. Mr. Ro.

Ro. Sowerby, 3; P. Mr. J. Stewart, all Æ. P. Mr. W. Toldervy, ii, iv, vi, viii. Æ. Mr. Todd, i, iii, iv. Miſs Thiſtle, ii, iii, v, v, vi, viii. Æ. P. Mr. Terey, 4. Mr. Wood, 3. P. Mr. D. Williams, 3, 4. Eclip. Mr. R. Williams, i, ii, iii, iv, v, vi. Mrs. Williams, Æ. 3, 4. Mr. J. Williams, all but vii, ix. Eclip. Mr. Woolliams, i, ii, iii, iv, vi. P. Mr. Wilſon, i, ii, iii, iv. Fr. Mr. Wyld, all but vii, viii, ix, and Pr. Mrs. Julette Woodfin, P.

The firſt Prize of 12 Diaries was won by Mr. *John Williams*, the ſecond by Mr. *Heath*, and the Third by Mr. *John Stewart*.

N. B. *The Cuſtom of foretelling the Weather being as ridiculous (amongſt People of Senſe and Science) as Fortune-telling, our Obſervations relating to the Weather (which often differs in different Places in England at the ſame Time, and happens ſometimes wet and dry on different Sides of the ſame Houſe) are now omitted for what is more uſeful and neceſſary.*

F I N I S.

Lately publiſh'd,

Beautifully printed, the Second Edition enlarged, with an Addition of 16 *Copper-Plates, of*

THE BRITISH CARPENTER: Or, A Treatiſe of Carpentry. Containing the moſt conciſe and authentic Rules of that Art, in a more uſeful and extenſive Method than has been made publick.

To which is added,

A *Supplement*: Containing *Palladio*'s Orders of *Architecture*, with the Ornament of Doors and Windows, proportion'd and adjuſted by Diviſions on Scales; together with the accurate Curves of their Mouldings, and their Application to Uſe.

By FRANCIS PRICE, *Carpenter.*

Having peruſed this Treatiſe of Carpentry compiled by Mr. Francis Price, *we think it a very uſeful and inſtructive Piece, and as ſuch, recommend it to every one concerned in Works of that Kind.*

N. Hawkſmoor,
John James,
James Gibbs.

N. B. Thoſe who bought the firſt Edition, may have the Additions alone.

Printed by C. Ackers, and ſold by C. Hitch, at the Red-Lion in Paternoſter-Row; and T. Aſtley, at the Roſe in St. Paul's Church-Yard.

Juſt publiſh'd,

In Two Volumes, Octavo, adorned with Cuts,

Price Ten Shillings *bound in Calf,*

THE HISTORY of the LIFE of the Em
CATHARINE. Containing a ſhort Hiſto
the *Ruſſian* Empire, from its Foundation to the
of the Death of that Princeſs: With an Account of her O
and of her *Conduct* during the Life of the Emperor PET

By JOHN MOTTLEY, *Eſq.*

Printed for the Author, and ſold by *T. Aſtley*, at the
in *Paternoſter-Row.*

Of whom may be had,

Mottley's Life of the Czar *Peter:* Adorned with a
Number of curious Copper Plates. In three Volumes, P

An Hiſtorico-Geographical Deſcription of the North
Eaſtern Parts of Europe and Aſia, particularly *Ruſſia*, *Sib*
and *Great Tartary.* With a large and accurate Map of
Countries, and Variety of Cuts, 4to

The *Life* of *Staniſlaus* I. King of *Poland*, &c. To w
is added, a Relation of his Retreat from *Dantzick.* In a
ter written by himſelf to a Perſon of Diſtinction. 1
Price 2s. 6d.

ARTIFICIAL Teeth ſet in ſo firm, as to eat with them,
ſo exact, as not to be diſtinguiſh'd from Natural. They are
be taken out at Night, as is by ſome falſly ſuggeſted, but m
worn Years together; yet they are ſo fitted, that they may be take
and put in by the Perſon that wears them, at Pleaſure; and are an
ment to the Mouth, and greatly helpful to the Speech. Alſo,
clean'd and drawn by *Samuel Rutter* and *William Green*, Operators,
apply themſelves wholly to the ſaid Buſineſs, and live in *Racquet-*
Fleet-ſtreet, London.

STEEL Truſſes, for Ruptures; Bag Truſſes, for fixed Tum
Back Irons, and other Inſtruments for the Lame or Crooked:
Stockings, Knee and Ankle Pieces, very uſeful for weak or ſw
Legs; by the Widow of *Peter Bartlet*, at the *Golden Ball* in St. P
Church-Yard, near *Cheapſide, London*, who ſucceeds her late Huſ
as Truſs-Maker to the Cheſt at *Chatham*, for the Help of his Maj
Seamen, and ſerves Gentlemen in the ſame Buſineſs. Perſons in
Country ſending their Bigneſs, and on which Side the Rupture is, m
ſupply'd with Truſſes and proper Directions.

h Cuts,

of the Em
ort Hiſto
on to the
of her Or
eror PET

Y, *Eſq.*

, at the

with a
olumes, P
he North
uſſia, Sib
Map of

&c. To w
ck. In a
tion.

with them,
They are
ed, but ma
ay be take
nd are an
n. Alſo,
Operators,
Racquet-

fixed Tum
Crooked:
veak or fu
ll in St. P
r late Huſ
of his Maj
Perſons in
ture is, ma